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Stock charts in full, page 149

Product Spotlight
Word processing:
The power of
the printed
word/**53**

In Depth
The rise of PCs,
the fall
of dedicated
systems/**79**

TOP OF THE NEWS

Third-party maintenance firm Sorbus, Inc. begins to reap the benefits of the deep pockets of Bell Atlantic, which acquired it 18 months ago. **Page 150.**

■

Hewlett-Packard rolls out its latest Spectrum machine, a processor that will unify its manufacturing and technical workstation lines. **Page 6.**

■

Fujitsu's U.S. subsidiary lands the first contract to supply end-user equipment for McDonald's ISDN trial. **Page 2.**

■

AT&T today is scheduled to unveil enhancements to its Systems 75 and 85 PBX products. **Page 2.**

■

Control requirements at the University of Michigan Hospital shape a new network management system. **Page 19.**

■

Pick-based systems help a company scoop up market share in a trailing-edge industry. **Page 45.**

■

Microsoft promises significant extensions to its Windows operating environment this week, including a major new communications facility and new support for dynamic exchange of real-time data between applications. A New York session (at the Windows on the World restaurant) also will highlight in-house Windows development efforts at some large corporations.

■

Wang Laboratories, Inc. will introduce, probably in the fall, an IBM-compatible laptop micro that features a built-in thermal printer, according to a major Wang user. "Wang is giving us a Cadillac. If it's priced aggressively, they will have a real success," the user predicted, adding that the unit will be offered to beta test sites in June. The laptop's 25-line LCD screen features an amber display with black letters. It is powered by the 80C86 CMOS chip, which makes it, like the Wang PC, twice as fast as the IBM PC. The system comes with 512K bytes RAM standard,

See **NEWS** page 5

Wang Office talks to IBM

Communication links to Disoss, Profs, 3270 forged

By Stanley Gibson

LOWELL, Mass. — Wang Laboratories, Inc. last week announced several links to IBM's office communications systems in a move to convince current and prospective customers that it has the superior departmental environment for IBM mainframe-based networks.

Among the communications links announced last week were the following:

- An upgrade of Wang's Office/Disoss Gateway from Version 1.0, introducing software Releases 1.5 and 2.0, both of which will include LU6.2 and Information

See **WANG** page 5

AT&T divisions back together

By Elisabeth Horwitt

NEW YORK — AT&T last week announced major organizational changes that signal its intent to return to a predivestiture unity as quickly as Federal Communications Commission regulations allow. The plans disclosed by AT&T Vice-Chairman Elect Randall Tobias would place AT&T Information Systems and Communications divisions under a single managerial structure, headed by Tobias.

The changes represent AT&T's first step toward coordinating sales, marketing and product development efforts for the two divisions. At the time of the AT&T divestiture, the FCC had originally mandat-

See **AT&T** page 6

Sperry users doubt value of Burroughs tie

By Alan Alper

NEW YORK — Sperry Corp. customers are demanding assurances that their investments in Sperry systems will be protected and enhanced in the years to come in the wake of Sperry's agreement last week to a takeover by Burroughs Corp.

Sperry's action occurred following two weeks of tense negotiations and after Burroughs agreed to a sweetened acquisition offer totaling $4.8 million in cash and securities.

Blumenthal

The proposed acquisition would create a corporation with $10 billion in revenue — second only to $60 billion IBM in the computer industry — and restructure the famed BUNCH lineup that for the past decade has watched IBM solidify an overwhelming lead in the mainframe market. The last major shakeups among large systems vendors came in 1970, 1971 and 1976: RCA Corp. sold its mainframe division to Sperry, General Electric Co. sold its computer division to Honeywell, Inc., and Xerox Corp. sold its mainframe division to Honeywell, respectively.

Sperry insiders contacted last week said there is a good deal of uncertainty within the organization concerning the merger's impact. "We've not gotten any word from management as to what's going on," said one middle manager, who requested anonymity. "No one knows where they stand."

Sperry users, meanwhile, continued to lament their mainframe supplier's potential loss of independence, taking little comfort from Blumenthal's statements that

See **SPERRY** page 4

CW EXCLUSIVE

Head crashes: MIS seeks aid for sensitive disk drive problems

By Donna Raimondi

MIS managers and disk drive vendors have discovered that the thin-film head technology used in new disk storage systems requires much stricter computer room purity than earlier disk types.

Thin-film technology uses heads that fly 12 to 13 microinches above the disk, as opposed to the 20 to 25 microinches of its ferrite-head ancestor. Not only is there less space between head and disk, but the material thin-film heads are made of is not as durable as the older ferrite materials, says C. E. Shannon, director of Customer Engineering Headquarters Operations at Memorex Corp., the storage products subsidiary of Burroughs Corp. "When a contaminant comes in contact with the new head, it won't bounce off like it did on ferrite. Instead, it crashes," Shannon says.

"In November, we were getting ready to install some Burroughs thin-film disk packs, and Burroughs had some concerns about our environment," says Jim Donovan, chief of computer operations at the University of Chicago Medical Center. Although the university's computer room was adequate for the two Burroughs B7900 computers and various Burroughs disk drives that inhabited it, the vendor was concerned that the more sensitive thin-film drives would not perform well there, Donovan says.

Burroughs had good reason to consider the air quality when it sold the new systems to the university. While many computers and peripherals are hardy and are not affected by slightly insufficient environmental purity, thin-film disks are very sensitive.

"Our air conditioner sucked air right off the freeway and blew it into our environment," says Chris Scharff, manager of information systems at Yamaha International Corp. in Buena Vista, Calif. The dirty air caused disk prob-

See **MIS** page 12

Fujitsu nets ISDN contract for Illinois Bell/McDonald's trial

For headquarters, training center net

By Peggy Watt

McDonald's Corp. and Illinois Bell Telephone Co. last week announced that the first equipment contract for their planned Integrated Services Digital Network (ISDN) was awarded to the U.S. communications products subsidiary of Japanese mainframe vendor Fujitsu Ltd.

Fujitsu America, Inc. of San Jose, Calif., will provide digital telephones, voice and data terminals, workstations and network adapters for the trial run, which is scheduled to begin later this year [CW, May 5].

Patrick Krause, telecommunications director for McDonald's, told *Computerworld* that Fujitsu was selected because it met contract specifications and could provide satisfactory technology, the required level of expertise and appropriate support.

Fujitsu, according to Krause, will be one of several customer premises equipment suppliers for the trial test. Other contracts are being negotiated, he said.

The parties involved refused to attach any dollar figure to the contract awarded last week and said only that Fujitsu would supply "a significant number" of the workstations to be used. More than 100 vendors were said to have inquired about various contracts for the project; about 20 submitted bids.

An Illinois Bell spokesman said the company is still negotiating to select an estimated five to 10 suppliers that will participate in the trial run, scheduled for December. He said the other contracts will be awarded fairly soon, in time for an organizational meeting of all participants in mid-June.

Under Illinois Bell's coordination, an ISDN of more than 400 lines will be built to serve the fast-food company at its corporate offices and training facility, Hamburger University, in Oak Brook, Ill.

The completed system will handle voice communications over internal, outside and long-distance network services, high-speed data transfer, image transmission, electronic mail and other information handling, all over the same lines from the same workstations. The trial run is expected to last 18 months to two years.

Krause said the initiation of the trial has been delayed because of AT&T's delay of software development for its Number 5 Electronic Switching System digital switch, which will provide the interface between McDonald's on-premises equipment and outside communications services. Testing will begin in November or December rather than in September or October, he said.

Fujitsu will supply multifunction digital telephones, intelligent voice and data terminals, intelligent workstations and adapters for gateways, said Lou Sena, Fujitsu manager of product line planning. None of the products to be used in the McDonald's trial testing are yet on the commercial market, but Fujitsu installed similar prototype versions in ISDN trials in Japan and Singapore, he said.

"I think McDonald's has a very clear and focused idea of what ISDN can do," he said. "This is a complex architecture, but the possibilities for applications are tremendous."

Fujitsu will use such standard hardware interfaces as RS-232 computer connections, RJ-11C for telephony and V.35 for high-capacity data transfer such as facsimile transmission. Other connection guidelines will come from the switch supplier, AT&T, with a 5ESS. The trial will adhere to the CCITT interface.

However, Fujitsu will still do some new development for the McDonald's trial test, Sena said. "We're taking the current models and building on their foundation, basically adapting a couple fundamental designs in image processing and the user interface," he said.

However, he said, Fujitsu does not expect to have to develop any major hardware from scratch for the Illinois trial. "We are already developing a product line," he added. "I think one of the reasons we got selected is not just our equipment but the experience we bring."

AT&T System 75 enhanced

By Elisabeth Horwitt

ATLANTA — A series of enhancements to AT&T's System 75 and 85 digital private branch exchanges (PBX) is scheduled to be unveiled today at the International Communications Association 39th Annual Conference and Exhibition.

The products represent another step in AT&T's strategy to use its digital PBXs as the basis for future Integrated Services Digital Network applications and services, said Senior Vice-President of Sales Richard C. Holbrook.

Highlights of the announcement include the following:

- Automatic Call Distribution, offered only on the System 75 digital PBX, enables a supervisor to reconfigure call control, send calls to the least busy unit and reroute calls to other groups during peak periods.
- The Inbound Call Director and Outbound Call Director, automate PBX-based functions such as call screening and call placement.
- A new family of Call Management Systems was designed to meet the call handling needs of telemarketers and other specialized users.
- Unified Messaging Manager and Unified Messaging Link integrate a wide range of AT&T voice and electronic mail products.
- Audio Information Exchange-Medium and Speak-To-Me enable users to create, send and retrieve voice and text through a Touch-Tone telephone, terminal or workstation.

In this issue

NEWS

See Page 53

COMMUNICATIONS

SOFTWARE & SERVICES

MICROCOMPUTERS

SYSTEMS & PERIPHERALS

COMPUTER INDUSTRY

PRODUCT SPOTLIGHT

IN DEPTH

OPINION & ANALYSIS

DEPARTMENTS

See Page 16

ILLUSTRATIONS ON PAGES ONE AND 17 BY ALAN WITSCHONKE

Two-step buy for Sperry

By Alan Alper

NEW YORK — Burroughs Corp.'s proposed acquisition of Sperry Corp. for $76.50 a share would be accomplished in two steps — the first in cash, the second in preferred stock and debt securities — according to documents filed with the Securities and Exchange Commission.

Burroughs has offered to purchase some 31 million Sperry shares at $76.50 in cash, which would give the Detroit-based firm majority ownership. After the offer expires June 10, a subsidiary of Burroughs, called SP Acquiring Corp. will be merged with Sperry.

At that point, the remaining Sperry shares will be converted into Burroughs 9¾% subordinated debentures, due in 1996, and Burroughs Series A cumulative convertible preferred stock.

Although Sperry's financial advisor, First Boston Corp., considered Burroughs' previous offers of $70 and $75 a share inadequate from a financial point of view, the $76.50 a share proposal was deemed "fair."

"If you look at the $76.50 price, it's much closer to Sperry's price of $80 a share than Burroughs initial price of $70," noted Harvey Poppel, a partner at merger and acquisition specialist Broadview Associates.

To aid the transition, Burroughs is attempting to enlist the aid of Sperry's top management.

According to the SEC filing, Burroughs is offering five-year management contracts to 26 Sperry employees, including Joseph J. Campanella, corporate vice-president and president of the Aerospace and Marine Group; Edwin Decker, corporate vice-president and president of the Defense Products Group; Edwin Gilbert, senior vice-president, controller and management information systems; Kurt Merl, vice-president and president of the Systems Management Group; and James Aldrich, senior vice-president of corporate planning.

Sperry users doubt value of tie

From page 1

the new corporation would support both firms' current computer architectures as well as accelerate development of enhancements.

Most users interviewed by *Computerworld* maintained the view held since Burroughs' renewed entreaties began early last month: A merger between the rival mainframe suppliers would offer few advantages to users and in fact could further erode confidence in both companies.

"I still don't see any benefits for the users," noted Martin Litzky, president of national Sperry users group Use, Inc. "If this is being done to reduce costs by $150 million, which is peanuts for a $10 billion company, it doesn't make sense. There are other ways to do that without merging two competing companies."

Burroughs officials said the proposed acquisition should be completed within the next two months.

The companies would operate somewhat autonomously under a yet-to-be chosen corporate name, with Burroughs Chairman W. Michael Blumenthal at the helm, Sperry Chairman Gerald Probst as vice-chairman and Sperry President Joseph Kroger as president of the Sperry unit.

Although Blumenthal emphasized last week that no attempt would be made to convert one set of customers to the other's products, some Sperry users questioned the long-term plausibility of that policy given the current incompatiblity of the two firms' architectures.

Sperry users fear loss

In the event Blumenthal abandoned that approach, Sperry users fear that it would be the Sperry architecture that would be jettisoned.

"If they tried to force me into a Burroughs environment, I most likely wouldn't move to Burroughs but to IBM," noted Robert Gatlin, director of Management Information Services at Ceco Corp.'s Metal Building Systems subsidiary. "From what I hear, a lot of people are reconsidering whether it makes sense to be non-IBM anymore."

Eventually, however, industry observers contend that if Blumenthal is to make the merger work, the new company is going to have to develop some sort of framework to tie the two disparate architectures together.

"That has to be a strategic goal over the next five to seven years," noted Harvey Poppel, a partner of Broadview Associates, a consulting firm specializing in mergers and acquisitions.

"They need to have some sort of unifying structure. That doesn't mean they have to combine the two lines into one, but building a bridge, like what Sperry did with RCA, so they could communicate back and forth," Poppel said.

Citing the accelerating pace of technological change, Use's Litzky said it would be hard to project what the combined company's product line might look like in the months or years after the acquisition is completed.

"It's hard to say what will happen in 30 days, not to mention what will happen in five years," he said. "If you told me 30 days ago Sperry would be acquired by Burroughs, I would not have believed it, and now it looks like it will happen."

> ”
>
> ***'If they tried to force me into a Burroughs environment, I most likely wouldn't move to Burroughs but to IBM.'***
>
> — Robert Gatlin
> Ceco Corp.

Sperry users are concerned because, as of press time, they had not been contacted by the supplier to apprise them of the situation.

That, observers said, is most likely to change in the near term.

"I expect that certain customers are going to be receiving a letter signed by Blumenthal and Probst within the next couple of days," Litzky said.

Some users, such as a group in New England [CW, May 25], have taken it upon themselves to contact Burroughs in an effort to voice their concerns on the implications of the proposed merger.

"I wrote Blumenthal the day after it was announced," noted John DiPalermo, director of the New York State Social Services Department's Office of Information Technology Management. "The thing I wanted to make sure of is that not only is the 1100 line supported but that the new company continues to sink R&D into follow-on products."

Most observers agree that initially Blumenthal will not make any moves that might disrupt either firm's operations.

Sometime later, however, expectations are that heavy staff reductions will be needed to reach the roughly $150 million in cost reductions that Blumenthal envisions in the first year of the combined companies' operation.

Blomenthal has dismissed such projectinns as "premature and totally inappropriate."

To take advantage of the so-called critical mass created by the merger, Blumenthal is likely to combine functions such as purchasing, R&D and administrative support. Analysts also expect him to close redundant facilities.

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Wang Office talks to IBM

From page 1

Distribution Services (IDS) as the VS-to-IBM mainframe transport options. Version 1.0 includes IDS only, which provides VS-to-VS communication over an IBM Systems Network Architecture (SNA) network. Version 2.0 includes a capacity to send Disoss documents that is not included in Version 1.5.

- Version 2.0 of the Wang/Profs Gateway, which will allow Wang Office users to exchange messages between Wang Office and Profs.
- Version 2.0 of Wang Office, which includes improved document scanning features.
- An IBM 3270 logon capability that will allow nsers of IBM 3270 terminals to log on to a Wang VS by way of an IBM mainframe.

The new products will be available in July, except the Disoss gateway Version 2.0, which will be available in the fourth quarter of this year.

Direct connection

Pointing to future developments, Wang said it will provide its VS computers with a direct connection to the IBM Token-Ring PC local-area network and will implement IBM's SNA Distribution Service on its Wang Office/Disoss Gateway.

Neil O'Brien, director of operations at Mony Financial Services in Syracuse, N.Y., said he is very interested in the Wang developments, particularly the LU6.2 implementation, and the 3270 Logon.

O'Brien estimated his department's investment in Wang equipment at $15 million, including what will be a total of 100 VS computers by the end of the summer. He said he is in the process of installing IDS and will likely add some of the announced products to his system.

"All the vendors have to be IBM compatible now in order to be in the running for requests for proposals. If you don't have Disoss, you're out of the contract," said Vincent Flanders, associate editor of *Access 86*, a magazine for Wang users.

Gerry Paul, Wang vice-president of communications software development, said the new products give Wang a lead over both IBM and Digital Equipment Corp. in connecting minicomputers to IBM mainframes.

"There's less headache than putting in IBM," he said. Paul said IBM has no Profs gateway on the System/36 and no support for the Disoss library interface. DEC sells Disoss connectivity products that include LU6.2 but does not offer a Profs interface.

"The real devil in Wang's eye is Digital," said George Colony, president of Forrester Research, Inc. in Cambridge, Mass., describing inroads that DEC's All-In-1 office automation product has made in Wang's share of the market.

Colony added, however, that Wang's announcements gave him a positive impression of the overall health of the company. The Wang 3270 VS Logon allows IBM 3278 terminal users to access Wang VS applications through an IBM mainframe, such as Wang Office and Pace as well as such peripherals as disks and printers. However, Wang officials said it is not yet known how many terminals the system can handle, and Wang is currently testing to determine its limits.

Version 2.0 of the Disoss gateway, which will be available in December, will enable a Wang VS user to send a Disoss document. Currently, a user can file and retrieve documents from a Disoss library but cannot send a Disoss file. In addition, Version 2.0 will allow a Wang Office user to add Disoss and Profs users to a Wang Office electronic mail directory as if they were Wang Office users.

Wang Office Version 2.0 improvements include a new document indexing and searching function that allows users to locate a document by author, title, date created and words in the text.

The Profs gateway consists of software on the VS, priced at $2,000, and software on the IBM mainframe, priced at $20,000; software for the 3270 VS Logon is priced at $2,000. Pricing for the Wang Office/Disoss Gateway depends on whether LU6.2 or IDS is used. LU6.2 and IDS software for the VS is priced at $4,000; Document Content Architecture to Wang word processing translators on the VS are priced at $2,000; LU6.2 software on the VS is priced at $3,000.

Wang also announced new Wang Office license fees ranging from $495 to $18,000.

TOP OF THE NEWS

NEWS from page 1

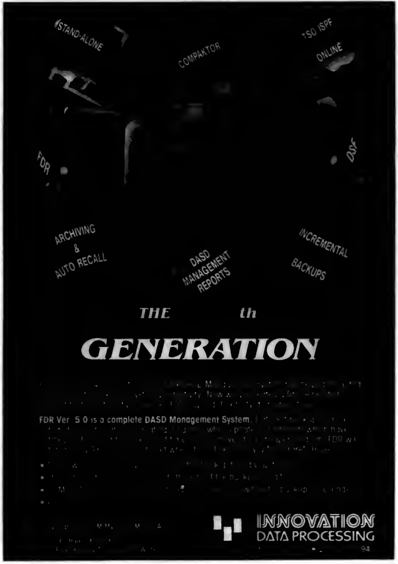
with an option to grow to 1M byte. The laptop features one 10M-byte, 3½-in. hard disk with an option to add another 3½-in. disk or a 5¼-in. floppy drive.

■

Electronic Data Systems is apparently the site of beta testing of a new 80386-based network, which was announced recently by Corvus Systems, Inc. of San Jose, Calif. Corvus spokesmen refused to say publicly where the tests were occurring, but sources said Electronic Data Systems has been working with Corvus on the processor for some time.

■

IBM has added its 1M-bit memory chip to a second product, the 3880 disk storage cache controller, which is now shipping from the company's General Products Division plant in Tucson, Ariz. Last month, IBM began installing the chips.



Spectrum ties HP's CAD, manufacturing product lines

HP's 1000, 9000 series converge at high ends

By Jeffry Beeler

PALO ALTO, Calif. — Uniting its two principal computer lines, Hewlett-Packard Co. last week introduced a Unix-based processor that is the first engineering-oriented offshoot of the company's Spectrum development project. The action represents the high-end convergence of the company's HP 1000 series manufacturing system and HP 9000 series engineering workstations.

HP spokesmen also contend that the 16- to 64-user processor, officially called the HP 9000 Series 800 Model 840, provides three times better price/performance than the Digital Equipment Corp. VAX 8600.

The 9000 series supports the same AT&T Unix System V-based HP-UX operating system as the Model 840, allowing users to recompile existing code when migrating over. But the HP 1000 series operates the Real-Time Executive operating system, and porting applications will require an extensive software conversion using a set of migration tools called Port/HP-UX.

> ***For the first time, HP is addressing both the manufacturing and engineering arenas through one product line, the 840.***
>
> **— Carl Morganstern**
> **HP Performance Technology Center**

The base configuration of the 840, with 8M bytes of main memory, expandable to 24M bytes of main memory, is priced at $113,500, which includes the operating system and a C compiler. According to HP, the unit is scheduled to begin shipping at the end of this year.

The Model 840 employs the reduced instruction set computing (RISC) architecture that was announced in February with the long-awaited HP Series 3000 Models 930 and 950 superminicomputers.

The 840 drew qualified praise from analysts. It provides HP with "a compute-server and data-resource sharer that was previously the missing link in their technical systems product line," said Dave Burdick, director of computer-aided design and manufacturing industry services at Dataquest, Inc., a San Jose, Calif.-based market research firm.

But the company's comparison of the 840 to the VAX 8600 was downplayed by analysts. "There couldn't be a worse comparison," said Charles Foundyller, president of Daratech, Inc., a Cambridge, Mass.-based research firm. "The 8600 is not a RISC machine, so they shouldn't be compared on a million instructions per second basis. It's probably 2½ times faster than the IBM RT Personal Computer; that would be a fair comparison."

Both Foundyller and Burdick found the 840 presently lacks the breadth of software available for the 8600.

For the first time, HP is addressing both the manufacturing and engineering arenas simultaneously through one product line, the 840, according to Cari Morganstern, a technical staff member with the company's Performance Technology Center.

The resulting union of the 9000 and 1000 families allows factory automation and computer-aided design or engineering systems "to speak the same language and share data between the two environments," Morganstern said.

HP President John A. Young said the Model 840 verifies the price/performance benefits the company projected for its RISC-based HP Precision Architecture. The Model 840 also "reaffirms HP's commitment to employ this new architectural foundation across all our major computer systems for years to come," Young said.

By eliminating infrequently used instructions and adopting other design tricks that further enhance throughput, High Precision architecture reportedly enables the 840 to equal the performance of a VAX 8600 for one-third the price. HP's performance claims were based on benchmark tests in which a 24M-byte 840, rated at 4.5 million instructions per second (MIPS), and a 32M-byte 8600 ran identical "computation kernals" that involved no I/O, according to an HP spokesman.

Like the latest additions to the 3000 family, the 840 supports HP's recently introduced Allbase data base management system, which is said to provide both relational and network interfaces to the same information.

The 840 also supports Advanced Research Projects Agency and the University of California at Berkeley Unix Version 4.2 interconnection capabilities as well as the firm's existing Network Services and LAN/800 link products, which together allow the workstation to connect to other HP systems.

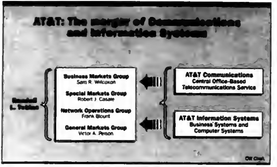
In a related development, HP last week offered five additional bundled versions of its HP 9000 Series 300 technical workstation family. Each of the packaged Model 320 systems is intended to compete directly with designated workstations from IBM, DEC, Sun Microsystems, Inc. and Apollo Computer, Inc., according to Ted Chen, HP's Series 300 and 500 product manager.

According to HP, the five additional Model 320 bundled systems range in price from $13,000 to $34,900, compared with $44,950 for the Model 560.

HP also announced the Model 560, formed by adding another two processors to its existing HP 9000 Series 500 Model 550 workstation and increasing its main memory. Unlike the 550, which incorporates just one CPU and starts with 2M bytes, the 560 uses three processors and holds up to 8M bytes, Chen said.

Senior writer Rosemary Hamilton contributed to this report.

MITCHELL J. HAYES



AT&T reunites two major units

From page 1

ed a division between AT&T's central office-based telecommunications services and its customer premise equipment and computer services, a mandate dropped in the FCC's recent Computer Inquiry III decision [CW, May 19].

"Now that the FCC no longer forces us to keep our networking and computer businesses apart, we can substantially improve our ability to focus our assets and abilities on specific vertical markets," Tobias said last week. .

The major impact on AT&T customers will be AT&T's ability to integrate the offerings of the two divisions at both the sales and product level.

"Before, if you were a large business, you would get calls from two sets of AT&T salespeople who often were competing with each other," said AT&T spokesman Michael Tarpey.

By FCC regulation, sales representatives from the two divisions could not even talk to each other before making their presentations, he added. "Now, we'll have one team head, with up to a dozen support people specializing in data/voice networking, PCs or whatever."

Responding to questions about recent losses in AT&T Information Systems' computer division, Tobias said that the computer business will be "increasingly important to AT&T. A lot of people have interpreted our strategy as being in the computer business, period. Instead, we will be leveraging our communications and networking offerings in the computer business, focusing on the three things together."

AT&T is currently examining how to coordinate joint development of products that would mesh AT&T Commmunications' central-office-based services and AT&T Information Systems' customer premise private branch exchange and switching equipment, he added.

Despite Tobias' assurances, Joaquin Gonzalez, a senior analyst at Stamford, Conn., consulting company the Gartner Group, Inc. interprets the recent organizational reshuffling as meaning: "The AT&T Communications way of viewing the world has triumphed over AT&T Information Systems." Gonzalez predicted that "AT&T will be de-emphasizing its computers" and emphasizing "its basic strength, which is its telecommunications network," over customer premise equipment.

In order to conform to FCC regulations, AT&T must continue to maintain separate accounting for the two divisions, Tobias said. "We've failed to find any 'noncompetitive' market where the cross-subsidizing regulations don't apply," Tobias said.

When asked if AT&T Information Systems and AT&T Communications will ever truly be one company, Tobias replied, "Never say never."

AT&T "does not expect any major layoffs to result from the organizational merger," Tobias said. "There will be some efficiencies as a result of the merger; with 210,000 employees, you can expect a lot of attrition, ups and downs."

"What AT&T announced is not the total organizational change," said Greg Carlsted, senior industry analyst at San Jose, Calif.-based consulting company Dataquest, Inc. "You can expect more announcements in the fall." He added that AT&T's new organizational structure is "significant in that they are positioning themselves to utilize their resources more effectively than they have done in the past. Now that they are free of the Computer Inquiry II ruling, we'll see some major changes in the way AT&T looks at its customer premise products and networking services."

Under the new regime, 92,000 AT&T Information Systems employees and 118,000 AT&T Communicaitons employees will be allocated among four groups, headed by presidents who will all report to Tobias (see chart). The four new organizations are the following:

- Business Markets Group, headed by Sam R.Willcoxon, oversees marketing and sales for all AT&T Communications products; AT&T Information Systems' large business systems including PBXs of 80 lines or more; and computer systems.
- General Markets Group, headed by Victor A. Pelson, oversees consumer products, sales and service, as well as general business systems (PBXs under 80 lines) from AT&T Information Systems; consumer markets and services from AT&T Communications.
- Special Markets Group, headed by Robert J. Casale, is responsible for managing selected joint ventures and partnerships with other companies.
- Network Operations Group, headed by Frank Blount, designs and manages AT&T's nationwide network. The organization's information management and movement resources will be available to the other three groups.

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Rolm to unveil low-end PBX

Digital system bucks feature-rich trend

By Elisabeth Horwitt

Rolm Corp. today is set to announce Redwood, an entry-level digital telephone system that can be configured as either a key system or a digital private branch exchange (PBX). The announcement precedes an AT&T low-end digital PBX introduction by approximately a week, according to analysts.

The new product "spans all the needs of the small- to medium-size business," according to Rolm President Dennis D. Paboojian. While CBX, Rolm's existing digital PBX line, starts at 32 lines, an entry-level Redwood system starts at eight lines, noted Judith Ross, product marketing manager for Rolm's Advanced Products Division. The system can be upgraded to up to 144 lines as a business grows, she added.

Redwood Model 1, a manual key system, is available now. Model 2, the key/digital PBX version, will ship in September. Customers can upgrade the Model 2 key system version to a digital PBX by changing the software, Ross said.

"Rolm has taken a risk, flying in the face of industry wisdom that says users want feature-rich digital PBXs," commented Greg Carlsted, senior industry analyst at San Jose, Calif., consulting company Dataquest, Inc. Rolm is banking on demand for an easy-to-install offering somewhere between a key system and a PBX in terms of functionality and price, he added.

Standard Redwood features include call conferencing, call forwarding and speed dialing. The PBX version also features least-cost routing.

"There *was* a demand for hybrid key-PBX systems, which was largely met by AT&T's Horizon and other vendors' hybrids," commented Michael Bobrowicz, a research analyst at Stamford, Conn., consulting firm, the Gartner Group, Inc. "We see current market growth as fairly flat."

The Redwood currently offers no direct link with Rolm's Phonemail, although users can forward or pick up calls on the voice messaging system, Ross said.

"The low-end market has small need for data," Ross said. "CBX serves our customers' data communications needs."

Carlsted criticized Rolm for not offering data on its initial Redwood offering but gave Rolm points for Redwood's support of Rolmlink, "a digital connection that is a step away from Integrated Services Digital Network and IBM connectivity."

Redwood pricing ranges from $600 to $800 per line, including telephone sets. The system's pricing per interface is 10% to 35% lower than that of the CBX, Ross said.

Tandem, Arthur Young joint CIM pact breaks new ground

By Rosemary Hamilton

CUPERTINO, Calif. — In an unusual alliance, Tandem Computers, Inc. announced last week that it signed an agreement with Arthur Young, a Big Eight accounting and consulting firm, to jointly provide products and services to manufacturing customers.

Although many vendors have forged partnerships to jointly develop manufacturing automation products, the Tandem alliance is apparently the first formal agreement between a computer vendor and a Big Eight consulting concern in the computer-integrated manufacturing (CIM) market.

Some observers question whether such an arrangement detracts from the consultant's role as objective advisor, but both Tandem and Arthur Young said the agreement is nonexclusive. Most of the Big Eight firms have informal working relationships with CIM vendors.

"We remain interested in other vendors because there are as many solutions to CIM as there are vendors," said Woodrow Chamberlain, a partner in Arthur Young's manufacturing consulting group. "We don't go out and recommend anything. But we are expressing an opinion that says you should consider Tandem seriously when considering CIM."

According to the agreement, Tandem and Arthur Young will provide a hardware and services package to customers "embarking on a major new strategy in CIM," said Gerald Peterson, vice-president of marketing at Tandem. Arthur Young will work with customers in the areas of software, training, support and overall strategy. Tandem will provide its line of Nonstop fault-tolerant computers and associated networking products.

Some of the other Big Eight firms said they have chosen not to make formal agreements because they have not found the appropriate partner or because they believe it would compromise objectivity.

Larry Roches, senior manager in the manufacturing consulting practice of Peat, Marwick, Mitchell & Co., said a formal partnership with a vendor would be "outside of our independence and objectivity policy."

John Arnold, a manager in the manufacturing consulting practice of Coopers & Lybrand, said that so far his firm has opted to work as a "preferred consultant" with vendors, such as Hewlett-Packard Co.

But at Arthor Andersen & Co., partner Roger Willis said the idea of a formal agreement has not been ruled out. "We've thought about it and haven't come up with a situation that seemed right," Willis said.

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LEADING MAINFRAME SOFTWARE VENDORS AS IDENTIFIED BY SURVEY RESPONDENTS

Percent of Installed User Base – 1984		Percent of Installed User Base – 1985		Percent Considering Vendor for 1986	
Manufacturing Resource Planning					
IBM	34.5	IBM	35.8	Cullinet	42.1
Sperry	9.9	Comserv	9.8	IBM	13.2
Comserv	9.9	Cullinet	9.8	Comserv	10.5
Arthur Andersen	5.2	Cincom	9.2	MSA	7.9
Burroughs	5.2	Martin Marietta	5.5	Cincom	5.3
Inventory Control					
IBM	38.4	IBM	25.6	Cullinet	21.4
Comserv	6.8	American Software	13.4	Undecided	14.3
Walker	6.8	Cullinet	9.8	American Software	11.9
MSA	5.5	MSA	9.8	Cincom	9.5
Sperry	5.5	Comserv	4.9	Arthur Andersen	7.1
Bill of Material Processing					
IBM	43.6	IBM	35.8	Cullinet	45.2
Comserv	9.1	Cullinet	10.4	Comserv	17.1
Sperry	7.3	Comserv	8.0	MSA	6.5
MSA	5.5	Martin Marietta	8.0	IBM	6.5
Arthur Andersen	3.6	MSA	6.0	Undecided	6.5
Master Production Scheduling					
IBM	34.0	IBM	25.5	Cullinet	37.5
Comserv	11.4	Cullinet	8.5	Comserv	16.8
MSA	8.4	MSA	8.5	IBM	9.4
NCR	6.4	Comserv	6.4	MSA	6.3
Software Intl.	4.3	Honeywell	6.4	Cincom	6.3
Integrated Financial (A/P, A/R, G/L)					
IBM	18.0	MSA	31.0	Cullinet	21.4
McCormack & Dodge	16.0	McCormack & Dodge	21.8	MSA	17.8
MSA	12.0	IBM	10.3	McCormack & Dodge	14.3
Software Intl.	10.0	American Mgmt. Systems	3.4	IBM	7.1
Information Associates	8.0	Cullinet	3.4	Lawson Assoc.	3.6

*The Software News/1986 Survey reports – "Cullinet's standings in manufacturing and financial software this year are clearly the most striking among all the mainframe software vendors. Cullinet, the leading independent supplier of mainframe database management software, began offering applications packages just three years ago."

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Trackside system logs official results of Indianapolis 500

By Eddy Goldberg

INDIANAPOLIS — This year's rain-delayed Indianapolis 500 was not the first time the racing event caused problems for the people running the computerized operation that logs each racer's laps, pit stops and official finishing times.

In 1964, when Jerry Challis wrote the first program to automate the official results, he was asked a week before the race what would happen if the race was stopped before the finish. Since the Indy 500 had never been stopped before, he had not planned on that eventuality.

But, sure enough, the race was halted on the first lap due to a serious accident. A car lost control exiting the fourth turn, hit the inside wall, bounced against the outside wall and exploded, Challis recalled. "Another car T-boned it, and both drivers were burned," he said.

Challis had to rush back to the IBM 7094 used that year and modify the program to subtract the time the race was stopped. The program was more fully modified before the next year's race in case it happened again. A. J. Foyt won that year with a speed of 147.35 mph.

In 1968, Challis rewrote the program in assembler language for the IBM 360. That program, later converted to run under IBM's MVS operating system, is still used today. However, the results were recorded manually and entered into an off-site compoter until 1978 when computers made their first appearance at the course itself.

The first trackside computer was called an Ascore, Challis said. Each of the 33 U.S. Auto Club timers pressed a stopwatch botton attached to the Ascore every time their car completed a lap.

In 1981, a Dataspeed RT500 computer (the RT stands for race track) was brought in and used as a backup to the Ascore. That was the year Bobby Unser won after a court battle that took the titie away from Mario Andretti.

Today, the Dataspeed RT500 is still used, backed up by an IBM Personal Computer XT. Two more XTs attached to the Dataspeed log the recorded data on a disk. The Dataspeed also has a feed to ABC, allowing the television network to broadcast the standings on a moment-to-moment basis.

After the race, the information on the PCs is transferred off diskettes onto an IBM 3033 mainframe, where Challis's 20-year-old programs compute the official results. The computer time is donated by the Indianapolis firm, Pallm, Inc., where Challis works. Pallm supplies software to the insurance industry.

The whole timing operation employs about 100 to 125 people, Challis said, and no two years are allke. Two years ago, when Rick Mears won in a record 163.62 mph, the Dataspeed went down 67 laps into the race, was restored and then went down again. The race information, which is ultimately backed up by people writing lap information on clipboards, had to be entered into the mainframe after the race. "We had to reconstruct the whole race afterwards," Challis said.

This year, although the rain delay did not cause any computer problems, it did inconvenience the roughly 400,000 fans who showed up. When asked what he did on the rained-out weekend, Challis replied, "We got wet."

Decision Data enters two systems in multiuser mart

Desksides compatible with System/36

By Alan Alper

NEW YORK — Decision Data Computer Corp., a supplier of IBM System/34, 36 and 38 peripherals, last week expanded into the multiuser computer market, unveiling two systems that are software compatible with the IBM System/36 as well as the IBM Personal Computer.

Although Decision36 is not plug compatible with the System/36, it is source-code compatible with the IBM system, which the company said enables it, after recompiling, to run business and professional application software written in RPG-II under IBM's System Support Program. It is also object-code compatible with Microsoft Corp.'s MS-DOS, so it can run application packages written for the IBM Personal Computer.

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> ***'If we used the technology used in 1971 to design the System/36, we'd be cheating the customer.'***
>
> — Larry Gerhard
> **Decision Data Computer Corp.**

Larry Gerhard, Decision Data president, said the firm opted against plog-compatibility with the System/36 because it wanted to improve on IBM's decade-and-a-half-old design. "If we used the technology used in 1971 to design the System/36, we'd be cheating the customer," Gerhard said.

Instead, he said, working with outside vendors, Decision Data designed a system using the Personal Computer AT bus architecture that could run third-party-developed applications for the System/36 while providing distinct price and performances advantages.

Decision36, initially available in a deskside or desktop configuration, is aimed at small to medium-size corporations, branches or divisions of corporations and, to a lesser extent, departments within large companies, noted Ed Marino, marketing director of Decision Development Corp., the Decison Data unit responsible for the marketing the system.

First-time users as well as current System/36 users are being targeted by the firm's direct sales force, distributors and value-added resellers, who will be marketing the system, he added. Current IBM resellers, in particular, are being approached to market the system.

One value-added reseller has already been signed, Executive Technology Data Systems, which sells into the certified public accounting market.

The primary deskside configuration supports between eight and 16 users and includes 512K bytes of main memory, 512K bytes of user memory on Intel Corp. 8088-based boards, up to 800M bytes of hard disk storage and an optional ¼-in. streaming tape drive for backup.

Supports ASCII, twinaxial devices

Both ASCII and twinaxial devices are supported. Prices range from $14,000 to $55,000 for a 16-user system with 800M bytes of hard disk storage, Marino said.

An entry-level desktop configuration, supporting between two and eight users, offers the same features as the deskside unit, but it can only be used with ASCII devices, Marino said. Prices range from $8,200 to $25,000, he noted.

Production quantities of the Decision36 will be available in September although select value-added resellers will be able to receive shipments beginning next month.

MIS seeks aid for drives

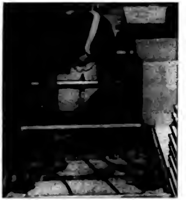
From page 1

lems that led to downtime. The company was experiencing problems with its disks, tapes and CPUs, he says, but primarily with the Memorex thin-film head disks.

Considerations that did not matter in the past have become vitally important. "Old specifications are not quite adequate if you are at the outside limits of the temperature and humidity ranges," Shannon says.

The environmental factors in computer rooms that Shannon investigated were within guidelines, as far as Shannon's staff could determine. They did find that humidity and temperature levels varied from one part of the room to another, in some cases. To get a better fix on the problem sites, Shannon called in Winton Laboratories, Inc., a worldwide environmental management firm with offices in the Los Angeles area.

Winton Labs, a closely held company that derives $9 million in revenue from computer-related engineering and consulting, specializes in finding the kinds of computer room problems that can wreak havoc on thin-film disks. "There should be an absence of carbon, rust and concrete dust. The temperature and humidity should be balanced. Those are the things to look out for," says Storm Larkins, president of Winton Labs. "Generally, if you are all right in those categories, you are not going to have problems," he adds.



Crumbling subfloors release dust into the air, wreaking havoc on thin-film disks. Winton Laboratories, Inc., an environmental management firm, decontaminates the subfloor surface.

At a large communications carrier that requested anonymity, walls were knocked down during a project to expand the computer room. During construction, dust settled under the floors and was sucked into the room through the air-conditioning system.

"In the last three- to four-month go-round before we discovered why we were having these problems, we had from seven to 10 head disk interferences a month," says the communications carrier's consultant of regional hardware plans.

All three of the above managers solved their once-mysterious problems by calling in Winton Labs to search for the source of pollution and eliminate it. In Scharff's case, he heard about the firm and contacted it himself. At the telecom company, one of the three IBM plug-compatible manufacturers (PCM) represented in the computer room called in Winton; Burroughs suggested to the University of Chicago that it call Winton. Memorex's Shannon says all of the companies he has found that perform the specialized work that Winton does are Winton subsidiaries.

In all cases, Winton Labs turned up the disk-crashing culprits, the managers say.

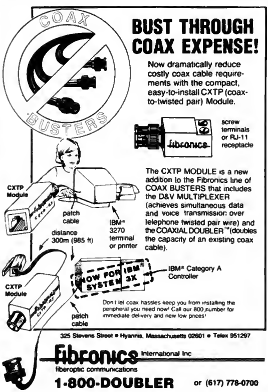
Yamaha's problems started in 1980, Scharff said. At that time, the company was unloading older IBM equipment and replacing it with a Burroughs B6800 computer and some new disk drives. Within 2½ years, the firm had gone to a second B6800 and had added more drives. "We began to experience problems that caused downtime," he says.

Winton discovered that Yamaha's 1970 air-conditioning system blew black hydrocarbon contaminants from the freeway right through the computer room. In fact, Larkins says, a map in Winton's offices that identifies problem locations is dotted with flags for a half-mile on either side of the Los Angeles freeway. Yamaha's site is alternately blown by the dry, dusty Santa Ana winds and soaked by nighttime fogs.

Another culprit at Yamaha was a crumbling concrete subfloor under the floor tiles that released dust into the room. Winton recommended replacing the air-conditioning system to solve the hydrocarbon problem and installing different ceiling tiles to help solve the humidity factor. The subflooring was coated with a blue-paint-like encapsulant that prevents further crumbling.

Scharff instituted other recommendations during a four-year period. "We are in the fourth year of improvements now, and it's all straightened out."

Scharff says he feels confident that his problems are gone, although he has contracted Winton to inspect the room quarterly and perform an annual cleanup. He has installed a Burroughs B7900 and new thin-film disks and has experienced no problems with either of them. "Our main production data base is on those thin-film disks, and they are hit with both reads



and writes several million times a day. They are doing fine," he says.

Yamaha did environmental monitoring on its own prior to calling in Winton, according to Scharff. They ran tests on the electricity to monitor drops and spikes and ran temperature and humidity graph units. "We saw the bad fluctuations but wondered where they came from," he says.

The same was true for the other computer rooms. "I could tell if the floor was dirty, and I kept track of humidity and temperature, but it takes some sophistication to detect the tiny particles that can cause problems with thin-film disks," Donovan says.

The considerable cost of making a computer room pure is insignificant in view of the value obtained for the money, all of the users agree.

"The cost is reasonable compared to what the downtime costs," says the consultant for the communications carrier, a company that needs to maintain at least 99% reliability. "We have not seen a head disk interference that can be attributable to dirt in more than three months now. That seems like an eternity to us."

The communications company serves up to 20,000 end users in three large computer centers that include two IBM 3090 Model 200s, three IBM 3084 Model Q64s and five 3081 Model K32s attached to 900G bytes of direct-access storage devices (DASD). The principal types of DASDs are IBM and PCM versions of IBM's 3380 thin-film device. "We were seeing numerous head crashes on the 3380-type DASD, and we were looking for reasons," the consultant says. "We prefer not to say which vendors' equipment we had the most trouble with, but we had the least problems with IBM's."

In the process of knocking down walls, the company never noted that the air-conditioning was pulling up dust from under the floor into the computer room. "We never got under the raised floor to look," he says. Winton recommended cleaning and sealing the floors and in addition checked for temperature, humidity, clean air conditions and proper filtering systems. "We were lacking to some degree in almost all of those areas. We changed our air-conditioning cycling so we do not pull in outside air without refiltering constantly. We sealed the floors, one of which was next to a loading dock, and we had our building maintenance people put in precautions to check humidity problems."

Donovan was impressed with the minuteness of the environmental inspections conducted at his site. "We installed three Burroughs 9630 laser printers, and Winton even inspected the best way to contain the carbon toner that these printers throw off," he says. "They suggested that we either create an I/O room outside the main computer room or that we relocate the printers inside the operations room but surround them by air grilles to keep the carbon toner directed away from the disk drives."

An encapsulant prevents further crumbling of the subfloor.

Shift seen for IBM CPUs

By James Connolly and Eric Bender

Speculation of a major shift in IBM's mid-range processor strategy grew last week with observers in the user, vendor and analyst communities predicting that IBM will soon announce some degree of unification of the System/36 and System/38 product lines.

The announcement could occur in mid- to late June, according to one user who asked not to be identified. He said that vendor sources in Europe told him that IBM plans to add RPG-III capabilities to a new version of the System/36 operating system SSP and that IBM plans a single replacement machine for the System/36 and System/38.

Speaking at a conference last week, consultants Amy Wohl and Dale Kutnick said they expect multifacted announcements from IBM.

Wohl, president of Wohl Associates in Bala-Cynwyd, Pa., reported that IBM officials recently spoke about "some kind of fusion of the 36 and 38 design."

Kutnick, executive vice-president of the Gartner Group, Inc. in Stamford, Conn., predicted that a small 4300, based on IBM's Micro370 processor running IBM VM Entry, could be announced by the end of 1986. However, he also said the System/36 and 38 could converge in four possible ways. The first way would be a large System/38 running SSP. The second means would be use of what he conceded would be expensive coprocessors. The third way would be to bring SSP and the System/38's CPF operating system together. The fourth approach would be to develop common hardware for the systems.

WORLD DIGEST

Computerworld News Service

PARIS — The French government announced last month plans to ease its regulatory grip on telecommunications services.

In a move that was expected since elections put a conservative coalition into power last March, the government's proposed legislation would open up competition for value-added services and free the Postal Telephone and Telegraph (PTT) of its industrial policy-making role.

Gerard Longuet, the secretary of state for posts and telecommunications, said the legislation will be voted on by the French Parliament before mid-July.

Since 1837, the PTT authority has maintained a monopoly over all telecommunications-related activities in France.

MUNICH, West Germany — Aggressive foreign competition — and a passive government response — forced West Germany's fifth-largest computer maker, Periphere Computer Systeme GmbH, to sell 65% of its stock to the steel and engineering company Mannesmann AG, according to Periphere Computer founder and Chief Executive Eberhard Faerber in a recent interview.

The company was swept off the market by such U.S. computer firms as Apollo Computer, Inc. and Sun Microsystems, Inc., he said.

BERGEN, Norway — Microsoft Corp.'s Norwegian distributor for IBM Personal Computer software, Logos A/S, has discontinued its contract with the U.S. software firm.

"The reason is lack of support, delays in deliveries and an ignorant attitude from the vendor," said Bjornar Langeland, Logos A/S president.

Langeland also claimed that Microsoft does not appreciate the need to translate its software into Norwegian, a key to success for other software distributors in Norway.

LONDON — The UK is now the first country in Europe to offer phone users a choice of telephone networks. With the inauguration of the Mercury Communications system last month, the monopoly of privatized British Telecom has come to an end

Although Mercury has been in competition with British Telecom since 1984, customers have so far only been able to lease lines from the fledgling carrier. But with the addition of three Northern Telecom, Inc. DMS-250 switches to its cable and microwave network, Mercury has launched itself into the voice switching business.

BRUSSELS — The clone wars between IBM and its price-cutting competitors took a new turn last month when London-based vendor Qubie Ltd. laid a formal complaint before the European Community Commission against the American computer giant.

Qubie is protesting that IBM's use of UK copyright and design protection laws to clamp down on clone vendors distorts competition in the European Community.

TOKYO — Hitachi Ltd. has announced plans to boost its purchasing of South Korean electronic parts by up to 55% this year, to $119.8 million.

These purchases will account for about half of all Hitachi procurements from Asian-based companies.

Because of the runaway appreciation of the Japanese yen against Korean currency, Japanese electronics vendors can now obtain Korean components for about 15% to 50% less than their Japanese equivalents.

Hitachi will buy largely from the three leading Korean electronics vendors — Goldstar Co., Samsung Electronics Co. and Daewoo Electronics Co.

VIENNA — Siemens Austria, a subsidiary of the West German computer and telecommunications giant, plans to merge its computer and data communications units.

Effective October 1, Siemens Data GmbH, the division selling terminals, personal computers and other OEM products, will be completely restructured, according to company officials.

The new unit is expected to employ about 1,000 people. Peter Amlinger, chairman of the board, said the firm is seeking to respond to customers' growing demand for systems that transmit and process voice, text, pictures and data.

TOKYO — Surveys may indicate that growth has leveled off in Japan's office automation market, but vendors at the annual Tokyo Business Show last month were out in force with networked and multitasking products expressly for the office environment.

During the show, attendees had the opportunity to hear one Japanese executive urge vendors to "take radical steps to create a new office environment."

That executive, Takao Nagata, chairman of the show's sponsor, the Nippon Administrative Management Association, delivered the keynote address.

Nagata's view was echoed by Masahiro Akita, a computer salesman with Sanyo Electric Tokki Co., who said in an interview that "networking, multitasking and distributed processing are the three most important buzzwords in the market today."

Former NCR users await legal action on systems claims

Allege extensive bugs and inadequate service

By Clinton Wilder

Hoping to capitalize on the precedent of the landmark Glovartorium, Inc. decision more than five years ago, four former users of NCR Corp. systems have legal action pending against the vendor for supplying allegedly defective minicomputer hardware and software.

Only one of the four unrelated cases involves a system still marketed by NCR. That system, a V-8555-II, is cited in a civil court case filed against NCR by Ryan-Walsh Stevedoring Co., a Mobile, Ala.-based cargo handling firm.

Other computers cited in the four cases are the 8200, 8230, 8250, 8400 and V-8455. All four plaintiffs claim their systems suffered from extensive bugs, resulting in so-called "silent death" crashes, data loss and significant down-time and that NCR was unable to adequately service the problems.

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> ***All four plaintiffs claim their systems suffered from extensive bugs, data loss and significant downtime.***

In the precedent-setting Glovartorium case, NCR paid $2.6 million in damages to an Oakland, Calif., dry cleaning firm that won a lawsuit over its troubles with an NCR 8200 [CW, Nov. 1, 1982].

According to court documents, Ryan-Walsh is seeking $1.5 million in compensatory damages and $10 million in punitive damages resulting from alleged system failures of a V-8455 and later a V-8555-II it leased in the early 1980s.

Ryan-Walsh is charging that both NCR and one of its salesmen misrepresented both systems as reliable and working.

Ryan-Walsh is seeking a jury trial for the case, while NCR has argued that the issue should be resolved through arbitration. Ryan-Walsh and its attorneys declined comment on the case.

Greeters of Hawaii, Inc., a tourist services firm in Honolulu, is seeking to recover $100,000 in payments to NCR, $450,000 in lost profits allegedly due to computer failure, "several million dollars" in lost potential revenue and unspecified punitive damages.

The revenue claim, according to a source close to the case, came from the firm's Aloha Reservations division, a subsidiary that set up an on-line reservation system on the firm's NCR 8230. Greeters of Hawaii claims it eventually had to sell the division after lost reservations and incorrect billing invoices, allegedly due to computer bugs, resulted in a significant loss of business.

Greeters of Hawaii has officially charged NCR with breach of contract, breach of warranty, misrepresentation and fraud. The plaintiff alleges that the Dayton, Ohio-based vendor "knew that the system had hardware and software deficiencies that resulted in lost data and shutdowns."

NCR attorney Pat Steiner could not be reached for comment on the case.

The Greeters of Hawaii case is scheduled for an arbitration hearing next month. Its leasing contract with NCR included an arbitration clause developed by NCR in the mid-1970s that specifies that any disputes over system problems must be resolved by an arbitrator rather than by a civil court judge or jury.

Nitram, Inc., a Tampa, Fla., chemicals manufacturer, originally filed its suit against NCR in district court in 1983, but the case has been stayed pending an arbitration hearing. Nitram alleges that its leased NCR V-8455 was plagued by disk crashes, slow response time and other problems.

Nitram eventually converted its billing system to an IBM Personal Computer. The user was forced to run its production control system manually, according to sources familiar with the case.

Nitram ceased its lease payments after the system proved unusable, and faces counterlitigation in state court from NCR Credit Corp., the vendor's leasing unit. Nitram is seeking to recover the lease payments it did make plus unspecified damages from business problems allegedly resulting from computer faults.

NCR attorney Robert Clark called Nitram's allegations "baseless" but declined further comment.

In another Florida case, Medical Billing Services of Orlando, Fla., is seeking more than $1 million in damages due to its alleged problems with an NCR 8200 and an 8250 in the mid-1970s, according to the plaintiff's attorney, John Mahaffey. Medical Billing Services claims it had similar file corruption and system crash problems with both the 8200 it purchased in 1976 and the 8250 it bought the following year

VIEWPOINT

EDITORIAL

The yen for revenge

Computer and semiconductor industry people can be forgiven the urge to gloat a bit at the turmoil that the strong yen has created within Japan's business and political circles. U.S. products that used to be priced far above comparable Japanese goods due to the stronger dollar are suddenly cost competitive in Japan.

Partially as a consequence, Hitachi Ltd. and Fujitsu Ltd., Japan's largest computer manufacturers, reported a profit drop for 1985, and the Japanese electorate may deny Prime Minister Yakusuhiro Nakasone a third term due to his seeming inability to counteract the trend. Still, however savory the irony, temptations to gloat must be resisted as being both premature and ill-founded.

For one thing, the strengthened yen, on the rise since last September, has yet to have a discernible impact on U.S. computer sales abroad. Hitachi, Fujitsu and other leading Japanese computer manufacturers will squeeze their profit margins before letting the higher yen affect price. The Japanese have long held market share to be more important than profit levels.

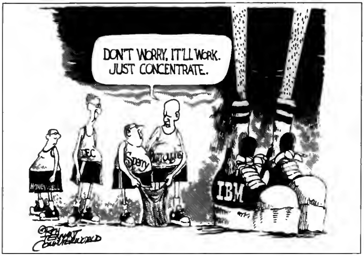
At the low end of the computer and peripherals markets, prices have not been dramatically affected, if at all, and here the Japanese are expected to expand manufacturing automation efforts to maintain a competitive advantage.

Rather than gloating — or worse, advocating reactionary protectionist measures like the massive trade reform bill approved last month by the House of Representatives — U.S. computer makers should take advantage of this unique opportunity to push further into Japanese markets. Prices are down, and the Reagan administration is hinting strongly that it would help curb the yen's rise if Japan helped create even more domestic demand for imported goods. This combination of government inducement and lower prices affords U.S. manufacturers an excellent opportunity to expand their Japanese market.

The payoffs are already starting to come for U.S. companies who have pushed to expand their Japanese market. Cray Research, Inc., for example, recently sold two of its supercomputers to Japan's Nissan Motor Co., despite the latter's close ties to Hitachi, and Isuzu Motors Ltd. has made a commitment to Burroughs Corp. equipment. Nippon Telephone and Telegraph just signed its largest non-Japanese supply contract ever, with Northern Telecom, Inc.

True, the trade frictions between the U.S. and Japan have miles to go before they are put to sleep. As we have noted in this space before, there are fundamental differences between the two societies that still must be bridged. But protectionist measures can only damage the ties between the two leading information systems providers in the world, damage that would have a profound impact on corporate information systems managers around the world.

Now is plainly not the time for the U.S. computer and semiconductor communities to gloat over the Japanese economic predicament or to seek U.S. government trade intervention. Now is the time for them to show their development, manufacturing and marketing mettle, competing vigorously for Japanese sales and allowing the free market system to carry the day.



LETTERS TO THE EDITOR

Data sharing threatens privacy

In your editorial, "Computers aren't the issue" [CW, April 14], and in Daniel J. Lasser's letter, "Misapplying the principle of privacy" about the editorial [CW, May 5], you both imply that "the privacy advocates" don't know what they are talking about simply because they are critical of the way computer technology is threatening individual rights.

Lasser even tells us how we should be more credible and sincere. One way, he says, is to distinguish just which sort of computer matching is tolerable and which is not. We have done just that in congressional testimony in December 1982.

Receiving welfare, paying taxes, working for the government, registering for the draft, using food stamps — these are not criminal; they are activities we encourage, and people who end up on lists because they do these things ought not be subjected to computer matches simply because the technology is available.

The reasons for this are both legal and moral: Those who formed our Bill of Rights warned against general searches of everybody's house in the neighborhood, for instance. The federal Privacy Act prohibits data sharing of this sort. And the reasons are also practical: Data collected for one purpose — whether a middle initial, Social Security number or address — is not checked for accuracy when entered if it is not crucial to the transaction, yet it takes on life-and-death significance when it becomes the basis for a "hit" that can deprive one of public assistance, a livelihood, freedom from prosecution or simply the right to be let alone.

Lasser also implies that we "privacy advocates" should quit worrying about disclosure of IRS information because a notice on our tax returns warns us that some tax information will be shared. Does he realize that the American Civil Libertes Union and other privacy advocates struggled hard — against the Daniel J. Lassers of the 1970s — to impose that requirement of prior notice?

In the 1980s we are simply saying that federal agencies ought to comply with the nondisclosure requirements of the Privacy Act of 1974 and the Tax Reform Act of 1976.

Both *Computerworld*'s editorial and Lasser's response repeat that old line that computers are not the problem. In fact, the massive data gathering of the 1980s could not possibly be conducted without automation. I worry less about personal information about me in a dusty folder at the bottom of a file cabinet than I do about the same information recorded for posterity in an automated system, which permits long-distance and simultaneous retrieval, which eliminates the old deterrents of cost and space, which rarely distinguishes between contemporary and outdated information and which permits merging, linking, rearranging and analysis.

Robert Ellis Smith
Publisher, *Privacy Journal*
Washington, D.C.

Personal data belongs to individuals

There are much deeper issues of law and morality underlying the recent editorial and letter about computer matching of files than those referred to by Daniel Lasser in "Misapplying the principle of privacy" [CW, May 5]. The one that is deeply embedded in Anglo-Saxon law is that everybody, even speeders and software pirates and welfare cheats, is presumed innocent until proved guilty. In continental Europe the Napoleonic Code led in a different direction, but in the U.S. the dragnet idea is not acceptable, in law or in good police practice.

Computer technology makes dragnetting cheaper and faster, and the current political atmosphere makes it otherwise tempting, but the Magna Carta and the Constitution will prevail.

It has been recognized in Britain and Sweden where oversight government agencies have been set up; it does not yet have the explicit support of federal law in the U.S. It is that personal data belongs to the individual, not to the organization that collects it, whether governmental or commercial, and can be used only for the purpose for which the individual gave prior consent.

Elements of this are found in official practice: IRS forms have a nonbinding reference, and on a homier level the Association for Computing Machinery controls its sale of mailing lists on that basis.

The abuse of credit agency information, driver and automobile registrations and even of such simple things as telephone cross-directories (which Ma Bell was always careful about) annoys every one of us. I hope that the file-matching discussion, and civil liberties concerns in general, will help eliminate those abuses.

Herbert R. J. Grosch
Mies, Switzerland

VIEWPOINT

Help wanted: Seasoned telecom execs with management savvy

Technical, business skills a must for fast-paced job

By RON SCHNEIDERMAN

Just a few years ago, market researchers were reporting that the demand, cost and growing variety of data communications systems were placing tremendous pressure on telecommunications managers to control costs and choose wisely among available options. It was an understatement then. Today, it's at best a gross oversimplification.

The technology is so fast moving, the issues so complex and the number of products and services so great that it is difficult for even the most experienced telecom specialists to keep up.

In fact, there are few people qualified to manage a corporate telecommunications system of any size. Yes, there are plenty of good voice-oriented "telecom managers" around. But very few qualified *corporate*-level people. And by all accounts very few, if any, voice people are able to make the transition.

Few have implemented systems

"We have a situation where it's very difficult to find people who have been successful in implementing systems to recommend to a client," says Vincent S. Morgan, managing associate of Korn/Ferry International, the largest executive search firm (headhunter) in the world. "As a result, we often see consultants on the case, and they're usually on top of other consultants."

This inability to find qualified people is forcing some large companies to take a backdoor approach. According to Morgan, companies are asking Korn/Ferry to survey other companies to determine how they are managing their total information resource, with a particularly hard look at telecommunications. With that information, these companies hope to better plan and integrate their MIS, office automation and telecommunications systems — at which point they can be more specific with Korn/Ferry about what kind of people they need.

Will they be able to find the right people? Robert A. James, national director of telecommunications for Arthur Young, a leading accounting and consulting firm, doesn't think so. He says the right people must be experienced and understand all of the technologies — voice, data, image, text, videoconferencing and graphics.

Equally important, he adds, they must understand their companies' business. This last point is a big one backed up by experience and research. A survey by the Omni Group, a consulting firm, indicates that corporate information services managers often don't understand what business their companies are in.

Voice-oriented people won't make it as chief information officers or even corporate telecommunications managers, says James, because they don't understand software. In addition, virtually every requirement in a telecommunications environment is unique and not amenable to a standardized turnkey solution. Systems are composed of a wide variety of transmission media and network technologies as well as a mix of terminals and other communications equipment and services.

Telecommunications already ranks as the second-largest expense at many large corporations, after salaries. Some knowledgeable projections call for data costs in large companies to pass voice costs within the next three to five years. One more heady fact: There are about 75 DP people for every 1,000 employees in large companies compared with one telecommunications specialist for every 1,000. "That has to change," says James.

Where are all of these managers going to come from? The breakup of AT&T all but did away with the biggest soorce of trained telecom people, forcing many companies to grow their own.

Undoubtedly, many of the new telecom managers will come out of the MIS area. At least they have a head start; they may be middle managers with computer science or engineering backgrounds who know a little about their company's business. A few companies have developed training programs, picking managers with a demonstrated knowledge of the business and its marketing strategy and some technical background

Training for telecom hard to find

There are schools, although very few, that offer specialized curricula. The Universities of Hawaii and North Carolina and New York University have telecommunications programs. Other schools allow their computer science and electrical engineering majors to load up on telecommunications courses, just as a business administration major might concentrate on marketing.

Last year, the State University of New York formed a multimillion-dollar Telecommunications Institute, a cooperative venture by the state and the Nynex Business Information Systems Co. One reason the program was started, according to a college official, was that "the industry tells us there is a need for 100,000 people with training nationwide, and very few colleges offer this program."

New demands for strategic applications, higher productivity and computer-integrated manufacturing and design activities will put increasing pressure on corporate and MIS management.

Recognition of the importance of the telecom activity will grow with the realization that rising telecommunications costs will more than offset lower hardware costs, even if rates drop. The question may not be — as it often is — what's the cost, or even who's in charge, but does he know what he's doing?

Schneiderman has been covering the computer and electronics industries as o reporter and editor for more than 20 years.

SDI demands trillions of instructions, 99.9999999% reliability

Success depends upon near-perfect accuracy in untested situations

READER'S PLATFORM

By DAVID BENDEL HERTZ

It has been said that the Strategic Defense Initiative (SDI or Star Wars) provides the U.S. with a rare opportunity to enhance national security and provide a basis for the next generation of industrial technology in one fell swoop. The military, academic and political communities are divided into two camps: "It will work" and "It won't work." But the real question is, How can we find out whether it will work if and when we need it?

The general idea of Star Wars is that a large number of American satellites will keep watch over the earth's surface and instantly spot the takeoffs of enemy missiles, which, of course, must be distinguished from other similar but harmless activities on the earth's surface such as oil field burn offs. Then the satellites will communicate with supercomputers on earth to track and destroy the detected missiles with defensive weapons such as X-ray laser beams or antimissile missiles. The entire process of sighting, identifying and destroying must take place in a few minutes.

It has been estimated that the number of coordinate instructions for the computers will number in the trillions and that there will be hundreds of thousands of performance-critical functions, some of which must be executed with a reliability of 99.9999999 or better.

To indicate the magnitude of this task, an AT&T report last year stated that there were an average of 300 "serious errors" in every 1,000 lines of computer code at some 200 major corporate installations. It is well known that no large-scale program works right the first time: It is very likely that some parts of the SDI programs will be using combinations of various instruction sets for the first time because some combination of circumstances involved in an attack situation will give rise to unexpected input data.

Some help in increasing reliability and getting around these problems may come from artificial intelligence programs that are intended to build error-free programs for complex systems using high-level languages and self-validation and verification.

But if there are errors in such self-verified programs, they will be much more difficult to detect in advance or to find later. Past experience in developing and implementing complex, large-scale-computer-executed real-time systems, in which extremely fast reaction in the face of changing and unanticipated inputs is required, does not provide much comfort.

There may be bugs hidden in the underlying models that the codes are intended to implement. It is very difficult, almost impossible, to validate models of situations and events that have never occurred, except in a genuine confrontation — and that may turn out to be a bit late. And even if the models are correct, it is always possible that some parts of the code might cause the computers and their backups to crash.

Realism most serious factor

The realism of the models is perhaps the most serious factor in assessing risks that the program won't work. The models must make some simplifying assumptions about the real world, perhaps distorting it sufficiently so that what had worked in testing the model doesn't when applied to an actual situation. But this cannot be known for sure in advance

How do we test for what may have been overlooked, omitted, misjudged? Could reliance on Star Wars as a "peace shield" lead to a worldwide *Challenger* disaster? How can we know until we try it? Are the technological risks, to say nothing of the political and economic considerations, worth it?

Open debate over these questions is essential to prevent the nation from being locked into a defense posture it will ultimately regret.

Hertz is Distinguished Professor and Director of the Intelligent Computer Systems Research Institute at the University of Miami in Florida.

***Computerworld** welcomes opinion pieces from its readers. Submissions to the "Reader's Platform" column should be typed, double-spaced and no longer than six pages. CW reserves the right to edit them for the purposes of clarity and brevity. Submissions should be addressed to Editor, **Computerworld**, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701-9171.*

COMMUNICATIONS

WIRE TAP
Daniel J. Rosenbaum

Look twice at ISDN rates

Most data communications managers worth their salaries are thinking about how an Integrated Digital Services Network (ISDN) is going to change their jobs. The really smart ones are wondering how they're going to pay for it.

There are three basic benefits to an ISDN: easier access to mid- and high-speed data transmission; simplified, call-by-call access to a full range of voice and data communications services; and access to network control information that previously had been the sole province of the telephone company.

An ISDN network includes at least two kinds of lines. The first is a 64K bit/sec. circuit-switched line designed to carry user-provided data. That 64K bit/sec. line is called the B ("bearer") channel. The second line is the D ("data") channel, carrying packet-switched access and call set-up information for a cluster of B channels. The D channel will operate at either 16K bit/sec. or 64K bit/sec. — depending on how many B channels are in the cluster.

ISDN allows you to pick your service on a session-by-session basis and lets you use and monitor setup data. If you have a sudden but infrequent need for a bandwidth-monopolizing service such as videoconferencing, ISDN will, in theory, allow you to literally dial it up.

The idea behind ISDN — and it remains to be seen if this will be the reality — is that users will have to pay only for what they use. That sounds

See **LOOK** page 23

Rosenbaum is the editor of "Wiretap," an information industry newsletter published in Morristown, N.J.

Hospital's needs set goals for Applitek net manager

By Elisabeth Horwitt

WAKEFIELD, Mass. — Applitek Corp. announced last week the commercial availability of Network Management System (NMS), minicomputer-based software that performs monitoring and diagnostics, accounting and security functions for the company's Unilan local-area network product line. Many of NMS's features were developed to meet the networking needs of the University of Michigan Hospital, an Applitek customer.

Applitek had already developed a basic diagnostic system that runs on Applitek's network interfaces, which link computers to the Unilan broadband networks. But the centralized management, accounting and security features were implemented at the hospital's request and according to its specifications, said Applitek spokesman Gerald McDonald. "The system would have been very different without the hospital's input," he said. "They helped us define the needs of large, multiuser sites."

The NMS collects statistics from each Unilan network interface and displays information on a color monitor. Traffic and error-frequency statistics are monitored and logged on disks for later analysis. Records are maintained of interface updates, such as changes in the number of terminals or transmission rates. The NMS also monitors and compiles data on user transmissions and sessions for security and accounting purposes.

The new management features were a prerequisite for Applitek's landing the contract for the Ann Arbor, Mich., hospital's major network installation, according to Robert Dieterle, manager of the hospital's pathology data systems. "We could never have run a network this size without some kind of network management system," he commented.

The hospital plans to use the network to support approximately 1,030 asynchronous terminals that will be used by students, clinicians, technicians and administrators to access Digital Equipment Corp.

See **HOSPITAL'S** page 22

System unites net management

By Stanley Gibson

CHERRY HILL, N.J. — A centralized network management system recently introduced by Infotron Systems Corp. is a "significant improvement over the often patched-together networks currently in use in many customers' locations," a company spokesman said.

The Integrated Network Manager (INM) consists of Infotroo's proprietary software and an Apollo Computer, Inc. workstation that features color graphics and multitasking windows. The system was designed to offer control of networks that include Infotron's 990NP network processors and its Infostream 1500 T1 multiplexers.

"INM offers customers gains in network availability and boosts network manager productivity, since a single operator can invoke network testing and diagnostics remotely instead of having to dispatch people to the site," said Infotron spokesman Robert Bower.

Previously, each network processor had its own network diagnostic system. The new system, however, allows an operator to monitor and diagnose the status of all the network processors and lines from one terminal, Bower noted.

The INM will save users money both by speeding up troubleshooting and by reducing downtime because of malfunctioning lines, he added.

The INM lets users concurrently monitor the network in one window, perform diagnostic testing in another and alter operating parameters in yet another window, according to Infotron. As many as 13 windows can be viewed at once, and information in the windows is updated in real time.

See **SYSTEM** page 23

NEW THIS WEEK

- Grid Systems offers a Distributed Secure Network for laptop microcomputers
- For more on this and other new products, see pp. 85-113.

INSTANT ANALYSIS

"The International Standards Organization's recommendations for defining field formats in financial transactions is another one of those standards where you give up a little efficiency in order to be able to add and change things more quickly and easily."

— Scott Loftesness, Visanet vice-president of access planning and implementation, Visa U.S.A., Inc.

Token-ring patent holder Soderblom squares off with 3Com

Polaroid precedent may be factor in suit

By Stanley Gibson

MOUNTAIN VIEW, Calif. — The Olof Soderblom patent controversy is rearing its head again as 3Com Corp. confronts the issue of paying the token-ring patent holder a fee for the use of the networking system.

"Soderblom is creating a significant problem for us and everyone else," said Robert Metcalf, chairman and senior vice-president of 3Com.

"We're arguing with Olof now," he added, indicating that the Swedish network designer has paid a personal visit to Metcalfe's Mountain View, Calif.-based company in order to discuss the question.

After developing and patenting a token-passing network system in Sweden in the 1960s, Soderblom filed for a patent in the U.S. that was granted Oct. 6, 1981, and is good for 17 years.

Founded company to sell patent rights

Following the granting of the Swedish patent, Soderblom assigned the rights on it to the bank for whom he developed the system. Later, the bank assigned the rights back to him, and he founded a company called Willemijn Holding Co. in Rotterdam, the Netherlands, to sell his patent rights. Soderblom has retained the Washington, D.C., law firm of Pollock, Vande Sande & Priddy to defend his patent rights in the U.S.

IBM reportedly paid Soderblom $5 million in 1980 for the nonexclusive rights to his token-passing configuration, and Ungermann-Bass, Inc. recently said that it would pay Soderblom for a license to market the system.

However, companies such as Natick, Mass.-based Proteoo, Inc. have not agreed to pay Soderblom. Proteon has been selling a token-ring network for several years, insisting that its system does not infringe on Soderblom's patent.

Polaroid decision may set precedent

Metcalfe said the recent instant photography patent decision rendered in favor of Polaroid Corp. has made many network professionals nervous.

The decision in that suit, in which Polaroid claimed that Eastman Kodak Co. copied its instant photography process, resulted in Kodak's having to abandon its line of instant photography products, which it had been selling for 10 years.

Some fear wasting net investments

Metcalfe said some networking professionals fear that a future court decision on Soderblom's token-ring patent might result in the waste of huge net investments, even to the point of having to tear cabling out of the walls of buildings.

Metcalfe explained that Soderblom is asking for a royalty of 1% to 3% of 3Com's systems' selling prices.

The royalty would include a per-

See **PATENT** page 22

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Hospital's needs set Applitek goals

From page 19

> ”
>
> ***'Some of our patient and accounting records reside on computers with no internal security. And we have graduate students working part-time in our laboratories who often get the urge to hack.'***
>
> — **Robert Dieterle**
> **University of Michigan Hospital**

VAXs and PDP/11s as well as Control Data Corp. Cybers and turnkey laboratory systems.

The hospital needed a centralized management system that would collect network performance statistics from about 43 Applitek NI10/T network interfaces distributed over approximately five miles of corridors, McDonald said. Also required was a way to store port configurations so that they could be downloaded to the network interfaces in case of update or network failure.

The hospital has stringent security requirements, Dieterle said. "Some of our patient and accounting records reside on computers with no internal security. And we have graduate students working part-time in our laboratories, who often get the urge to hack," he noted.

Multilevel security

It was the hospital's idea to install multilevel security, McDonald said. On the network interface level, each port is assigned a "mask" containing up to 95 names, each of which provides the user with access to a different network resource. Still under development is a password security system that would enable users to petition the NMS for permission to access a particular network resource.

This second level of security is important for organizations such as the hospital, which have terminal pools shared by a changing group of people, McDonald noted. "Port-based security is probably sufficient when managers are assigned terminals on a fairly permanent basis," he added. Users can also access resources through the NMS when they are temporarily using a different port, Dieterle noted. "Users should be able to access the same resources from anywhere on the system."

Report generation is another NMS feature still under development, McDonald said. The existing system can be programmed to poll each network interface in turn at regular intervals and compile statistics on how many times a device had to retransmit within a given time period, "so you can diagnose trouble before it becomes serious," he explained.

Network resource use

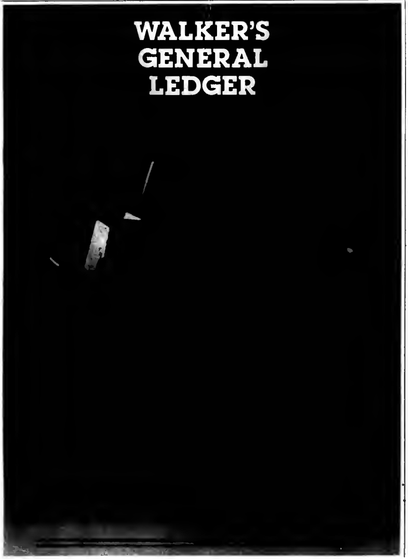
The NMS also keeps track of the use of network resources for accounting and billing purposes. But Applitek currently offers no package that analyzes network statistics and generates reports on overall network traffic patterns, error frequency and resource usage, McDonald noted.

Instead, customers can create their own customized reports using the DEC Record Management Service or other RSX-11 or VMS-based report generators. Applitek has indicated to the hospital that it will be offering a reporting package by the end of this year, Dieterle said.

Current gaps in the NMS product "don't inhibit us now but could be annoying in the future," Dieterle commented. "We are thinking of implementing the network campuswide, but not until Applitek's hardware, software and network management is all in place."

Applitek announced the NMS a week after a similar introduction by Infotron Systems Corp., a wide-area network equipment vendor currently working out the details of a friendly acquisition of Applitek. "It was a complete coincidence," McDonald said. He added that a priority of the merger will be integrating the two companies' network management systems.

The NMS runs on a multitasking DEC PDP 11/73 or MicroVax II, under RSX-11 or VMS. Available now, its pricing starts at $20,000.



Patent holder squares off

From page 19

centage of the value of the devices attached to the system, including mainframes.

Texas Instruments, Inc., which sells 3Com the chip sets used in its system, said it believes it is not liable to pay any patent license fees, but that systems sellers would have to pay any fees necessary.

Metcalfe pointed out that although the Institute of Electrical and Electronics Engineers, Inc. (IEEE) had held off making Ethernet a standard until it had settled patent questions with Xerox Corp., IEEE made IBM's Token-Ring specifications an industry standard even though Soderblom's patent claim was still pending.

Metcalfe is known as the father of Ethernet, which he developed while employed by Xerox.

Look twice at ISDN rates

From page 19

great, but take a closer look at what it is you're using

Some of the tariff structures used for today's networks probably still work with ISDN, but there are some wrinkles that alert data communications managers should think about today, even though they may not get the chance to use ISDN for the next five years or so.

Pre-ISDN switched networks insulate users from the setup and service selection processes Service selection was always built into network access, you could not make a voice call over a line conditioned for data, for instance

Also, the cost of call setup was built into the price of a phone call That's why the first minute of a call is more expensive than subsequent minutes — it costs more to provide that first minute.

Besides the data you send during a communications session (which in ISDN would be on the B channel), you are exchanging setup and call status information with both the network and the called station (on what would be an ISDN D channel) Because of the flexible nature of ISDN, you are likely to have to pay for everything you transmit, no matter which channel it moved on, just as you now pay for every second a session is active.

Valuable information

There is some justice to this, since D-channel information can be spectacularly valuable — perhaps even more valuable than the session it controls

If you have full access to your network's control information, you will be able to get an exact measurement of who is using the network for what at which hours.

You'll be able to precisely charge back on a department, project or station basis. Call-accounting costs will drop dramatically, as will the man-hours required to create the appropriate call-accounting data bases

What's more, because setup information includes the originating phone number, you will be able to tell who is calling you before you answer your phone For that matter, you'll be able to program your phone to reject calls from certain numbers or sets of numbers Self-configured WATS is more than a vague possibility.

All of this has a significant downside, though Setup information is transmitted *even if the call isn't completed* If you pay for everything transmitted in ISDN, you will be paying for no-answers and busy signals as well as completed calls

No one will tell you that When you ask AT&T about how ISDN will break down costs, they say they're still thinking about pricing issues — just before they tell you that setup takes so few bits that any charge would be "negligible" On a station-by-station basis, that may be true But how many calls are placed every day in your network, and how many of those are uncompleted?

On the other hand, the information ISDN gives about uncompleted calls can tell you useful things, such as whether your network resources are deployed where they are really needed

The bad news, then, is that ISDN may well mean you'll have to pay for uncompleted calls The good news is you may find strategic uses for the data those calls generate

ISDN is, at minimum, five years off If you're smart, you'll be thinking about ways to take advantage of it before it takes advantage of you

System unites net control

From page 19

The manager can view the entire network on the display screen, depicted as a color-coded map, with deteriorating lines drawn in yellow and line failures in red

A warning system that includes an audible alarm can be programmed by the network manager to alert him to deteriorating network conditions. For example, he can be informed when the frequency of errors rises above a predesignated threshold A log records the date and time of all network alarms.

The system also offers a statistical summary of traffic utilization, average and peak loading These reports can be stored on disk, archived on tape and reviewed later on the workstation.

ANM not made obsolete

The introduction of the INM does not make obsolete Infotron's other network product, the Advanced Network Manager (ANM), the company said.

Based on an IBM Personal Computer XT or AT, the ANM is sufficient for small networks that include either Infotron's 990NP network processors or the Infostream 1500, according to Infotron.

However, when the number of T1 lines in a 990NP network increases or the net's size increases to more than 32 990NP nodes, INM is needed, Bower said. The INM can handle up to 64 990NP nodes and 14 T1 lines.

An INM designed to manage a network based on either Infotron's Infostream 1500 or the 990 Network Processor costs $80,000; an INM designed to manage a network that uses both types of system is priced at $100,000. The first product shipments are expected in September, according to Infotron.

SOFTWARE & SERVICES

SOFTALK
Frank Sweet

The high cost of sales hype

Do you remember the commercial that brought the Ronco company into the annals of American folklore? It sold a device comprising a slanted plastic platform with a slightly raised horizontal blade at the lower end. It was called a "Veg-O-Matic." It had no moving parts. You worked it by pressing a vegetable onto the platform and sliding it over the blade. "It slices! It dices!," the man on TV smiled as he deftly reduced a raw potato to a heap of thin slivers.

After ordering one and finding myself unable to duplicate the performance, I studied the ad more closely. Only then did I notice that the friendly demonstrator had forearms like a blacksmith. He was awe inspiring. In a brawl, the fellow could have pounded me into the ground like a tent peg.

Tool salesmen stress their products' features and downplay the training they take to operate. They must, of course. They want to encourage sales, not frighten people away. And more often than not, no harm is done. One does not normally shop for a tool unless one has some training or experience in working it. Craftsmen seldom confuse artist and instrument. No musician asks the violin salesman if his product will play a great sonata. Writers do not ask if a typewriter will compose a novel.

There is one field, though, in which tool buyers and tool users are different populations, with often catastrophic consequences — data processing. This is probably because our profession is too new for our talents to have percolated into public lore.

Whatever the reason, hardware and software are often selected by those

See **HIGH** page 28

Sweet is a free-lance data base consultant in Jacksonville, Fla. He publishes "Boxes and Arrows," a monthly newsletter for Cullinet Software, Inc. IDMS users.

Cobol utility passes first test

Networking extension 'lived up to its promise'

By Jeffry Beeler

PALO ALTO, Calif. — An enhanced version of a systems utility that reportedly allows Cobol object code to be ported among dissimilar network nodes has received the first independent confirmation of its developer's performance claims.

In tests that International Data Corp. (IDC) conducted recently at its Technology Laboratories in Palo Alto, Austec International Ltd.'s just-announced Distributed Data Access (DDA) product "lived up to its promise," according to an IDC report.

The report's conclusion marks a turnabout from the market research firm's initial skepticism toward DDA and its reputed capabilities, which seemed "too good to be true," the five-page document said.

IDC is thus far the only known organization outside of Austec itself to have tested the DDA product under conditions that approximate a realistic work environment. The product was announced last month in New York.

Austec, a 9-year-old Australian supplier of Cobol compilers and application generators, describes DDA as a networking extension to its existing Acebridge utility, which reportedly enables heterogeneous systems to operate together as one virtual machine.

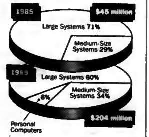
Since Acebridge's introduction in 1984, Austec has signed license agreements that make the product available with a raft of processors running Unix, Microsoft Corp. MS-DOS and IBM MVS. A few examples of CPUs that already support the utility include IBM's IX/370-based mainframes, NCR Corp.'s Tower, AT&T's 3B line and Digital Equipment Corp.'s VAXs.

To date, Austec has been unsuccessful in its efforts to negotiate a licensing arrangement with IBM that would give users access to Acebridge in the MVS and VM realms.

Both Acebridge and Austec's Ace Cobol, a compiler that is reportedly compatible at the source-code level with most other Cobol compilers, are prerequisites for using DDA.

See **COBOL** page 27

Data dictionaries: Growing, independent marketplace



Information provided by International Data Corp.

MITCHELL J. HAYES

DEC system targets utilities

By Charles Babcock

MARLBORO, Mass. — Electric and gas utilities and petroleum exploration firms are among the target customers for a data base management system introduced by Digital Equipment Corp.

The $9,090 DBMS, Spatial/II, is designed to manage information by geographical reference using the DEC VAX line of computers. It will be available in August.

Spatial/II is intended to permit definition of data by points, chains, polygons, triangles and variable grids. These data structures allow a description of locally defined data in a three-dimensional context, according to Linda Moore, manager of DEC's Marlboro, Mass.-based Earth Resource Engineering Group (EREG).

DEC spokesman Ed Canty said the VAX line is frequently used in oil exploration and that the need for a DBMS to handle geographic information "has been evident since the group was formed" three years

See **DEC** page 29

NEW THIS WEEK

- Hewlett-Packard offers an Ada compiler
- Honeywell ports its CP-6 operating system to its DPS 90 information processing system
- For more on these and other new products, see pp. 85-113.

INSTANT ANALYSIS

"The cable between the 3B2 and the 6300 system was unplugged to verify that the program was really executing locally."

— IDC Technology Laboratories report on the new Austec Distributed Data Access product

Cobol utility passes first test

From page 25

To take advantage of DDA's purported capabilities, a user first must provide each node in its target network with Acebridge, which typically sits atop a processor's operating system. The user also must run its existing Cobol applications through Ace Cobol to ensure that all systems in the network are compatible with each other at the object-code level.

Once all the software preparations are complete, DDA permits application code to be shipped from any Acebridge-supported processor to any other system, regardless of make, in the same network, according to Austec President Leslie McNeill.

For users, such portability of Cobol application code yields a number of benefits, McNeill claims. Included is the ability to do the following:

- Balance processing burdens by downloading applications from an overtaxed central system like a VAX-11/780 running Unix to an IBM PC-DOS-based IBM Personal Computer AT, many of which are often underused.
- Write an application on one network node, and execute it on another.
- Allow systems to obtain needed applications by using software that already resides on dissimilar nodes rather than by forcing users to develop redundant programs from scratch.

To check McNeili's product claims, IDC devised a series of tests in which DDA was required to perform several everyday operations on an Austec-supplied mailing list application.

In the first test, the application's source code was customized through modifications. After compiling and executing it on an AT&T 3B2/400 running Unix System V, IDC downloaded the resulting object code through RS-232 serial connections to an AT&T Personal Computer 6300 using MS-DOS and to an NCR Tower XP. The code was again executed.

"The cable between the 3B2 and the 6300 systems was even unplugged to verify that the program was really executing locally out of memory on the 6300," the report stated. "This verified the portability and downline load capabilities."

In the second test, the same application was required to retrieve and update files on the 3B2 and the Tower XP while being executed on the 6300. A subsequent check of each file confirmed the successful completion of the modifications, the report said.

In the final test, the application ran simultaneously on the 6300 and Tower XP, while both machines also updated a file on the 3B2. "Record, not file, locking worked as specified, and the integrity of the data was preserved during simultaneous access," the report said. A similar test involving a PC AT and Personal Computer XT connected through PC-Net reportedly produced the same results.

"The application program's knowledge of the environment and the location of object and data files is made available to Acebridge and DDA through the use of environment variables, which specify a path where Acebridge will search for the named data or object file," IDC said.

DDA will be priced from $500 to $1,000 per node. Austec is negotiating distribution and support agreements with hardware vendors.

> ❞
>
> ***Since Acebridge's introduction in 1984, Austec International Ltd. has signed license agreements that make the product available with a raft of processors running Unix, Microsoft Corp. MS-DOS and IBM MVS.***

CA-JARS/CICS Release 5.0 gets CICS 1.7 support

By Eddy Goldberg

GARDEN CITY, N.Y. — Computer Associates International, Inc. recently enhanced Release 5.0 of its CA-JARS/CICS product to provide support for Version 1, Release 7 of IBM's CICS teleprocessing monitor running under MVS. The CA-JARS products provide an automated means of measuring software productivity and system performance.

CA-JARS/CICS Release 5.0 came out in January and contains major functionality and feature improvements over the prior release that supported CICS Release 1.61. The recent enhancement to CA-JARS/CICS supports CICS 1.7, which was introduced by IBM last August.

The number of extensions that IBM made in CICS 1.7 required significant extensions to the monitoring product, explained David Tory, senior vice-president at Computer Associates International.

CA-JARS/CICS is available for both the MVS and DOS/VSE environments.

The perpetual license price is $19,000 for the MVS version. The DOS/VSE version currently supports CICS 1.61 and is priced at $11,500.

The high cost of sales hype

From page 25

without the wherewithal to do so competently. The least damaging results are cases in which we spend thousands of hours doing the best we can with tools that are defective or incomplete.

The saddest are those in which the unfortunate buyer sincerely believes the tool can do the job without a craftsman. Consider three tools with which we build on-line data base applications for mainframes: teleprocessing monitors, conversation controllers and data base management systems.

On-line data processing works like a polite conversation — the participants take turns. After pressing a function key, the CRT operator waits, keyboard locked, until the computer responds. Then the computer waits until the person answers and so forth.

Since computers work faster than people, we expect tools for building on-line applications to free the machine automatically for other things while awaiting human response.

Since programs run amok now and then (runaway index, say) we expect the teleprocessing monitor to protect programs from one another. Since transmission costs bandwidth, we expect the conversation controller to transmit and receive only what's changed on the screen since the prior iteration.

Finally, since programs abend or power fails in midflight, we expect the data base management system to notice when something goes wrong and put everything back the way it was, automatically, on its own, without intervention.

Tortuous programming

Yet most teleprocessing monitors provide no automatic conversation control. They require tortuous and developer-costly programming to avoid putting the partition to sleep after each mainframe-to-CRT transmission. The most widely sold such product vulnerably exposes on-line tasks to each other — one runaway program can overlay and destroy all on-line activity.

Most on-line development packages provide no application-view screen buffer. They inflict the program with raw incoming transmission fields (low values if no transmission, data if there was).

Even Cullinet Software, Inc.'s ADS/Online (the very top of the line, in my opinion) transmits all data fields to the CRT when you ask for a display, regardless of how many fields were altered by the program.

For years, one of the largest selling data base management system packages on the market compelled retrofit. It forced data processors to track down and recompile every program ever written that used a record when that record was expanded with new data.

The instruction manual of another popular DBMS that boasts of automatic recovery warns that it can handle only "planned failures." In other words, its highly touted automatic recovery works only if you carefully shut the system down before power fails or software crashes.

The point is not that tools are imperfect and are continually improved. It is not even that some features are essential to the very reason for a tool's existence. A knife that does everything but cut is worthless.

Data independence, intertask storage protection, transmission buffering and automatic recovery are as essential to their respective tools as cutting is to a knife. But we all hope to get smarter with years, and tool builders are no exception.

No, the point is that, in each case, competing tools are available that contain these essential features; yet those lacking them sometimes sell more successfully. The reason is that, in contrast to typewriters, violins, radio telescopes or shovels, the people doing the buying are often not the ones who must use them.

A salesman wearing dark-blue suit and white oxford-weave button-down shirt with black tie once explained why. He confided, "Executives don't buy on the basis of features. They buy based on trust." He reminds me of Kaa, Mowgli's cobra acquaintance in Rudyard Kipling's *The Jungle Book*: "Trusssssst me."

You know, when you think about it, the terms "user-friendly," "relational," "nonprocedural" and "distributed" have something in common. It is this: Any DP professional who uses one of these buzzwords should be summarily dragged out back and shot. The words meant something when first coined. They have since been debased into meaningless noise by vendor puffery. "My data base is more relational!" they scream. "My spreadsheet is more user-friendly! My cigarettes are milder and more flavorful!"

Aaarrrggghh.

The cost of misguided tool selection, in inadequate applications, bloated DP staffs or inflated hardware configurations, must be staggering. But it pales in comparison to the cost of tools without craftsmen.

When microcomputers first began to proliferate in firms with mainframes, many data processors feared becoming casualties of the micro revolution. Control and security were what we complained about, but the real issue was power. The chill deep in our hearts was that our captive customers would get away. We thought that users' cost issues were their smoke screens to escape.

We were right, of course. The more aggressive users enthusiastically pursuing micros did so precisely in the hope of fleeing the shackles of their glacial DP department. Why

should they wait six months for a report when, with their own equipment, they could have it now?

Today the dust has settled. The videogame fad has gone the cyclical way of hula hoops and miniskirts.

Microcomputers in large organizations have fallen into three roles, none of which seriously affects mainframe data processing.

Some are desktop tools for truly stand-alone purposes (word processors). Others download mainframe data and transform it into spreadsheets or graphs — more effective presentations than columnar fanfold reports. (Downloading is cheaper, too — the traditional way of conveying data from mainframe to executive involves grinding up forests.) The rest make splendid doorstops.

The "free at last" phenomenon is not new. It has been with us since our profession's beginnings. An IBM manual on DP organization, published in 1962, spends a chapter explaining that it's less costly to have one big DP department than for each user to have his own computer, complete with programmers. Birds of a feather train each other.

The distributed processing fad of 1978-1979 was touted as the breakthrough enabling each user to have his own machine. Today, a "departmental machine" wave is building strength — the latest reincarnation of the same flawed reasoning.

Hospital trauma

A hospital was trapped in a snarled portfolio of obsolete and unmaintainable applications on an IBM 370. (How they got into the mess is irrelevant to the story.) They understood the vendor to say that if they bought a System/38, their problems would be solved because it needed no programmers to run it. (The vendor probably said it requires less support because it does less.)

The notion of a self-programming computer matched their dreams, and they bought it. Now they have a 370, a System/38 and even more programmers supporting both. They are still entangled in the same obsolete application portfolio.

A prospect once told a Cullinet executive he was hesitant to buy IDMS. A competing DBMS salesman had assured him that his product would cost less in salaries. It required no data base administrator. The Cullinet executive suggested that the buyer request a list of the competitor's satisfied customers. "Call one of them. Ask for the data base administrator. I guarantee that someone will answer the phone."

In 1971, South American revolutionaries took over a profitable service bureau and fired the "capitalist technocrats" who ran it. The abandoned machines were rusting within a year.

In each case, the reasoning seems to be that if one buys the right brand of canvas, it will paint a masterpiece on its own. The reasoning is flawed because what limits success is and always has been talent, not tools. There is a knack to building applications, a learned skill. Talented people, plus their instruments, produce useful results.

Buyers who swallow the notion that a piece of software or hardware can do the job without talented people condemn themselves to Sisyphean disappointment. (Sisyphus, in mythology, was doomed forever in Hades to roll uphill a boulder that always rolled back down.) Sellers who claim their DP product slices and dices without need of talent prey on ignorance, intentionally or not.

Those of us who make a living selling are sometimes tempted to join the crowd and propose such fantasies, especially when the prospect seems ready to fall for a competitor's even-wilder promises. It would be a mistake, though.

Our industry is maturing. Long-term customer satisfaction, not an immediate sale, is what counts. And over the long pull, it is the tool user, not the tool buyer, who must be satisfied — today's programmer is tomorrow's vice-president of MIS. Software vendors might take a lesson from the dinosaurs. Extinction, you see, is nature's gentle way of suggesting you made a slight mistake.

DEC system targets utilities

From page 25

ago. The DBMS was developed by the EREG.

The data base was designed to integrate a variety of applications, including gridding and contouring, computer-aided mapping, remote sensing, seismic interpretation and modeling, well-log analysis and reservoir simulation, Moore said.

It is supplied with an interface that provides a menu-driven access to the system. End users may access files by recognition instead of recall. Experienced users may define commands without following a menu sequence, while programmers may use the interface's menu command builder, menu structure editing and prototyping, Moore said.

An assortment of file and graphics utilities aids in making use of the information stored in the DBMS.

A domain manager controls user access. An interactive editor permits the creation and modification of graphics or text data.

A data scanner checks for errors, calculates fields and verifies records. A topology builder generates complex data structures from simple data elements. A graphics module allows the construction of 3-D graphics.

In addition to utilities and petroleum exploration firms, Spatial/II is targeted at government agencies and the telecommunications industry, Moore said.

SMALL TALK
Eric Bender

Radical change in PC software

This is a clean-slate approach to exploiting personal computer hardware, that may turbocharge today's applications and radically change the way users deal with today's machines. It's coming in the not-too-distant future from Lotus Development Corp. and — surprise — it's not a secret.

In fact, Lotus' principal technologist, Jerry Kaplan, outlined the scheme several times, the first being at the Lotus Developers Conference earlier this spring. The reasoning goes like this:

"The design of the present generation of PC programs reflects the constraint of the mainframe environment and the discipline of structured programming," he said. "Neither of these are particularly well suited for PCs. . . . PCs are not miniature mainframes; they are used by different people and for different purposes."

With microcomputers, "we have an individual user working through a known interface with a predictable load and known resources," Kaplan pointed out. "This stability explains why micro software is more effective in general than mainframe software — PC applications have fewer design constraints."

In mainframes, he continued, the operating system really can't make intelligent decisions about what to do with its resources. Usually it knows only that there is a need for the CPU or for some device or file or data. Applications thus are designed to minimize computation

See **RADICAL** page 42

Bender is Computerworld's *senior editor, microcomputers.*

Package plugs real-time data directly into 1-2-3

By Douglas Barney

WILMINGTON, Mass. — Laboratory Technologies Corp. late last month announced Labtech Real Time Access, a $195 software package that allows popular Microsoft Corp. MS-DOS applications to display, access and analyze real-time data from industrial and laboratory processes.

Real Time Access allows technicians, scientists and engineers to work with real-time data without having to develop special routines for data transfer, control timing loops or instrumentation drivers, the supplier said.

The software is the first data acquisition/analysis package that directly plugs real-time data into Lotus Development Corp.'s 1-2-3, according to Frederick Putnam, president of Laboratory Technologies.

Competitive products generally require custom applications for data analysis, he said. "Real Time Access brings this kind of real-time monitoring into that Lotus standard for the first time."

Option to Labtech Notebook

Real Time Access works as an option to the $895 Labtech Notebook, which the firm claims is the most popular personal computer-based data acquisition package.

"Previously, Labtech Notebook could collect the data, but to move it into another package required putting the data on disk and then bringing it into the other package," Putnam noted. "Real Time Access eliminates the disk and moves data in the other package directly through memory. It turns out to be 10,000 times faster to transfer data to a Lotus spreadsheet."

The ability of Labtech Notebook and

See **PACKAGE** page 44

High-end graphics tools debut

Supports IBM's EGA, 2,000-image data base

By David Bright

CAMBRIDGE, Mass. — Visual Communications Network, Inc. (VCN) last month introduced a high-end business graphics software package that supports IBM's Enhanced Graphics Adapter (EGA). The VCN Concorde, a $695 package, operates on the IBM Personal Computer XT and AT on a stand-alone basis or with spreadsheets exporting Data Interchange Format files such as Lotus Development Corp.'s 1-2-3.

"This is the year of graphics," VCN Chairman Hoo-min D. Toong declared. Toong said that corporate users and consultants require better graphics than those provided by programs such as Lotus' 1-2-3 and Symphony. "Graphics needs have grown from simple bar graphs," he said.

Toong stated the success of VCN Execuvision, the company's first graphics package, bears out this trend. He estimated about 30,000 copies of VCN Execuvision have been sold since the product's introduction two years ago.

The new package's features include animation, freehand screen painting, text manipulation and self-running presentation capabilities. The painting capability provides multiple-level zoom, a choice of 64 colors and complete scaling.

Fifteen high-resolution and 15 medium-resolution text fonts that can be scaled, tilted, shadowed, colored or underlined are available. These features can be integrated with charts and other traditional business graphics created by VCN Concorde.

The package comes with a data base of over 2,000 icons, symbols and images. Users can also create their own logos and images and add them to the data base. Output media include 35mm slides, overhead transparencies and printer hard copy. The software is currently available.

INSIDE

NEW THIS WEEK

- University of California at Berkeley offers Turbo Pascal graphics tools
- For more on this and other new products, see pp. 85-113.

INSTANT ANALYSIS

"The Intel 80386 allows us to create virtual software machines. . . . There's not going to be a single operating system of choice. Things like LISP operating systems may find themselves coresident in this kind of architecture with Unix and MS-DOS."

— **Neil Colvin, chairman, Phoenix Technology, Ltd.**

Accelerator board reportedly allows IBM PC to run two tasks at once

FRAMINGHAM, Mass. — Targeting the "most demanding" personal computer users, Alloy Computer Products, Inc. late last month introduced an accelerator board that reportedly allows IBM Personal Computers to run two tasks simultaneously. More than 20% of the installed base of IBM Personal Computers, Personal Computer XTs and ATs would have a need for such a product, Alloy product manager Dave Friesen claimed.

The $995 Bi-Turbo board also provides disk caching and a private RS-232 port for second task use.

According to Friesen, Bi-Turbo is compatible with all IBM PC software and should appeal to users who would otherwise use multitasking programs such as Microsoft Corp.'s Windows or IBM's Topview.

Bi-Turbo allows users to run lengthy tasks such as invoicing along with a spreadsheet or other application, Friesen said. For single applications, users can choose between the IBM PC's processor or Bi-Turbo's 8-MHz NEC Corp. V20 processor by means of a hot key.

Instead of replacing the main system's processor or having it function as an I/O processor, the board assigns one processor to each task.

Hyperdrive 2000 release postponed until late summer

Bug found in internal hard drive for Mac Plus

By Peggy Watt

CAMBRIDGE, Mass. — Buyers of Apple Computer, Inc.'s Macintosh Plus are installing hard disks in greater numbers than purchasers of earlier Macintosh versions, according to John Ison, director of product planning at General Computer Corp.

But they are not yet able to buy General Computer's Hyperdrive 2000 internal hard disk drive and coprocessor board, announced at the Macintosh Plus introduction in January, because release of the product has been pushed back until late summer.

"Synchronizing the coprocessor turned out to be harder than we expected," Ison said. He claimed the product was well into beta-testing when a bug was discovered, and the release date was revised to allow a complete design review and a new test schedule.

The new Hyperdrive 2000 will cost $3,195. It will replace the Macintosh CPU with a 12-MHz Motorola, Inc. 68000 microprocessor and include a 20M-byte internal hard disk drive, another 1.5M bytes of random-access memory on the board and a floating-point 68881 coprocessor for mathematical calculations.

Upgrade kits

Upgrade kits to move from General Computer's 10M- to 20M-byte Hyperdrive models, in both the original and Macintosh Plus-compatible versions, to the Hyperdrive 2000 will be available for $1,899, according to Ison.

General Computer already offers an upgrade kit for current owners of Hyperdrive hard disks who are upgrading their 128K-byte or 512K-byte Macintosh to a Macintosh Plus.

To ensure the Hyperdrive's compatibility with the new 800K-byte disk drive, General Computer sells an $89 upgrade with new system software, Hyperdrive read-only memory, drive bracket, cable and manual.

Macintosh owners who used third-party upgrades and replaced their system's logic board need a $299 General Computer upgrade that also includes a new Hyperdrive controller board.

Hyperdrive family prices cut

With shipment of the Hyperdrive upgrades, General Computer also dropped prices on its Hyperdrive family, originally introduced in November 1984.

The 10M-byte Hyperdrive now sells for $1,399, down from $1,699; the 20M-byte disk costs $1,699, reduced from $2,199.

Scheduled for release in June is General Computer's Hypernet, $295 file server software that allows as many as 32 Macintosh computers to share files, storage and programs on an Appletalk network. It is said to support the Corvus Systems, Inc. Omninet semaphore protocol for compatibility with multiuser application programs.

As a feature unique to General Computer, Hyperdrive internal hard disks do not void the Macintosh warranty when installed by a dealer.

Apple's recent shuffling and pruning of its dealers hit a few Hyperdrive dealers, who were cut by Apple but left carrying General Computer's accessories, Ison said. The hard disk company then beefed up its financing, support and marketing programs for its 1,500 dealers.

General Computer will retain dealers that wish to carry Hyperdrive, despite a lack of Macintosh microcomputers.

A STUDY COMPARING DEC, PYRAMID, SUN, AND SEQUENT LED TO THE FOLLOWING CONCLUSIONS...

CLEA

There's only one thing bigger than DEC's VAX® when it comes to UNIX® timesharing.

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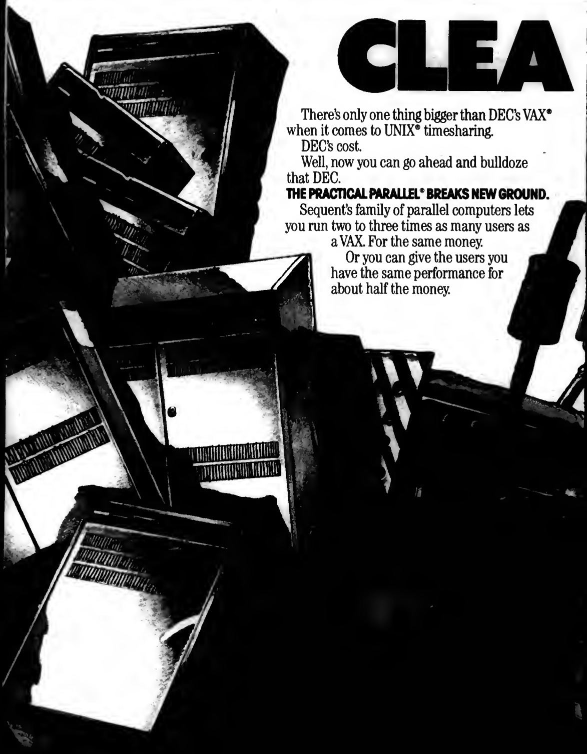
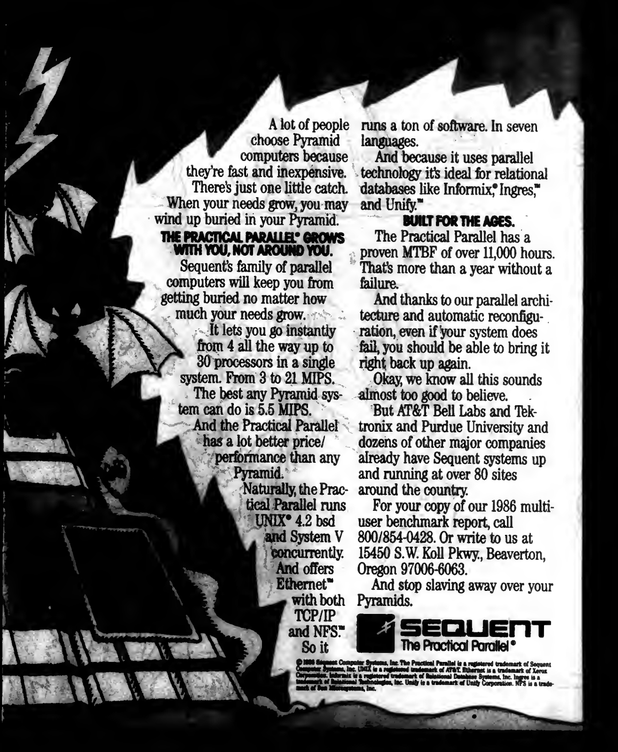


THE CURSE OF

THE PYRAMIDS.



A lot of people choose Pyramid computers because they're fast and inexpensive.

There's just one little catch. When your needs grow, you may wind up buried in your Pyramid.

THE PRACTICAL PARALLEL® GROWS WITH YOU, NOT AROUND YOU.

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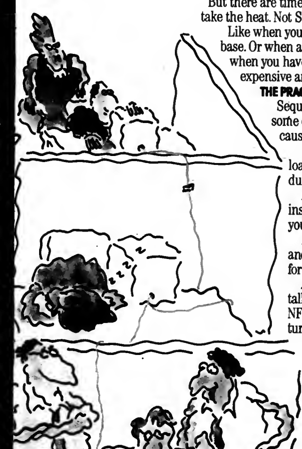

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Tool said to give four IBM PCs emulation capabilities via single board

By David Bright

BILLERICA, Mass. — Responding to increased demand for links between IBM Personal Computers and System/34, 36 and 38 minicomputers, Ideassociates, Inc. has developed software enabling four IBM PCs to share an IBM 5251 emulation board.

The $495 Ideacomm 5251/Share resource-sharing package sharply reduces the cost of 5251 terminal emulation, according to Leslie Lord, product manager. Lord said the package is targeted for users who may only connect to the host minicomputer about 15 minutes per day.

Ideassociates also added IBM 3180 terminal emulation to the board as well as the ability to display up to four concurrent host applications in windows.

In a multiple IBM PC configuration, one micro functions as a server, and as many as three others can be connected via RS-232 ports or asynchronous modems. The server PC can also operate as a stand-alone workstation, and the connected PCs can access either the server's printer or the mini's printer.

Since the 5251/Share software always runs in the background, the server's session is not interrupted when one of the connected IBM PCs accesses the host.

While data travels between the server and the host at 1M bit/sec., the IBM PCs connected to the server are limited to a 19.2K bit/sec. transmission rate.

Available this month, the improved Ideacomm 5251 card retains its original price of $895. A complete package with Idea 5251, Ideacomm 5251/Share, an Ideamini card with two serial ports and cable costs $1,495.

PC local-area net resellers form group

By Stanley Gibson

Pooling their resources to gain national stature, several personal computer local-area network resellers recently formed an organization called the LAN Group.

"The best way of thinking about it is as a national distributor with offices in different cities," offered Jay Leifheit, president of Tel-Matic Systems, Inc. of Toledo, Ohio, one of the member companies. The group will enable its members to sell to large end users that have networking needs in widely separated locations, Leifheit explained.

The LAN Group is now forming a Delaware corporation to be owned equally by group members, although it is unclear where the corporate headquarters will eventually be located.

Each member company is about equal in size and expertise, with company sales of roughly $10 million annually, according to several group members.

There are no plans at this point for a merger of the member companies.

Companies forming the LAN Group are: Tel-Matic Systems; Costa Distributing, Inc., San Francisco; Cache Data Products, Inc., St. Louis; Comtec, Inc., Roanoke, Va.; Microserv Technologies Corp., Needham, Mass.; and CPU Corp., Houston.

Most of the companies sell Novell, Inc. network products and ITT personal computers.

Over time, the member companies expect to look more and more like one nationwide distributor. Leifheit said the group has been working together for the past six months establishing member guidelines.

Radical change in PC software

From page 31

between input and resource and to relinquish the CPU while they're waiting for input.

But with PCs, Kaplan said, "allocating of resources is the responsibility of the application, and it can perform this task a lot more intelligently."

Kaplan proposed a program architecture "based on the principle that the machine's resources should be fully occupied at all times."

This "strategic programming" would replace the standard mainframe read/process/output scenario with a read/prioritize and queue/execute setup.

"This architecture separates the order of requests from the order of execution," Kaplan explained. "Requests can be processed in any order, as long as the world is 'consistent' after each operation. It allows the application to allocate resources intelligently, using knowledge of the specific problem and environment."

Going one step further, requests are broken into as many pieces as possible, so the scheme becomes read/decompose/prioritize and queue/execute incrementally.

This is crucial to the scheme — not just doing background tasks per se, but breaking all tasks into minimal units.

Okay, here's the payoff: "If the units are small enough, the time required to execute a given unit may not be noticeable to the user. Under these conditions, the user is never locked out from the application."

Among potential benefits, the system now can update the screen before completing an operation, precompute potential Next screens, anticipate costly future commands, perform internal housekeeping in background or accept new requests while performing old ones.

But more strikingly, the micro also can charge into tasks that previously were infeasible: identifying data base inconsistencies, checking grammar, creating user profiles, performing inferences and making suggestions to the user.

In a film shown at its annual meeting, Lotus jokingly acknowledged the uneasy feelings that aggressive micros might raise. In one slide, a Macintosh displayed a "Mac Critic" window asking, "You're not going to wear those shoes, are you?"

"In what we're calling mixed initiative systems, the program as well as the user can initiate action," Kaplan remarked. And yes, that does seem a little different.

A related design goal is to let users give vaguely defined orders, as in Lotus' upcoming HAL add-on for 1-2-3. However, another issue comes up as the computer begins humming away happily at these tasks — in Kaplan's words, "the notion of damage within a program." You want the system to say, "Are you sure about that?" if you tell it to reformat a hard disk, for example.

This all would produce fundamental changes in the way people deal with computers — getting used to computers initiating action and getting used to relinquishing a certain level of direct authority. These concepts haven't bothered those who have seen them so far, but those are programmers rather than regular folks, Kaplan admitted.

And, of course, this all presupposes a single-user, single-tasking environment. "When you need outside resources, that assumption is blown," Kaplan said. "You really need a way to tell the operating system how important tasks are."

Borland releases enhancement tool for Reflex use

SCOTTS VALLEY, Calif. — Borland International, Inc. has announced Reflex Workshop, a $69.95 enhancement tool with built-in vertical applications for use with its relational data base manager Reflex, The Analyst.

The package consists of a 250-page workbook and diskette with 26 working examples of common data base applications, including personnel file maintenance, accounting, order entry and scheduling. Some are drawn from actual in-house applications, and others handle tasks reflected by frequent calls to Borland's technical support, said Joanne Sakai, technical support assistant manager.

"A lot of people have been asking for ways to get started," she said. "Many of our calls are application-oriented and less technical problems."

Reflex Workshop runs with Reflex on the IBM Personal Computer and compatible systems and requires at least 384K bytes of random-access memory and a graphics board.

Reflex Workshop is scheduled to be available this month. Borland will bundle it with Reflex for $199.95 during an introductory period.

The Workshop's data base models are divided into four main categories: finance and accounting; administration; sales and marketing; and production and operations. Specific uses are included in each category, with examples of how to employ the data within Reflex and how to customize data bases for individual use.

Reflex offers five ways to view data, including forms, lists, graphs, reports and cross-tabulation charts. It also accepts data from several popular spreadsheet programs and other data base management systems.

Package plugs in real-time data

From page 31

Real Time Access to run on inexpensive personal computers should broaden the market for data acquisition products, Putnam predicted.

"It used to take a $70,000 computer to do real-time analysis. Now all you need is 512K bytes and Lotus," he said.

With Real Time Access, information from data gathering devices can automatically update spreadsheets, giving scientists and quality controllers the ability to continuously monitor assembly lines and experiments.

"This package cuts across all types of research activities, industrial quality control and industrial manufacturing process activities," Putnam said. Key markets for Labtech are the petrochemical, chemical, pharmaceuticals and automobile industries. Sales are also expected to medical schools and universities.

Key applications

Key applications include statistical process control, custom process monitoring, security systems, physiological monitoring, electronic testing and energy management systems.

One example of the use of Real Time Access, Putnam suggested, is in monitoring engine pistons coming off an assembly line.

"If the piston goes outside of the limits which are derived from statistics that are calculated on-line by a spreadsheet, you get an alarm. Then a worker goes over and adjusts the equipment so the pistons are produced within spec," Putnam said. "What we are bringing with Real Time Access is the capability to do all of that on-line and to do the whole thing in a Lotus spreadsheet."

Laboratory Technologies may eventually butt heads with Lotus, which plans to introduce products for engineering and scientific data acquisition and analysis.

"We have kind of a funny relationship with them, because rumor has it that they are working on a product to do similar things to what our product does," Putnam said.

In fact, Lotus recently released a catalog of scientific products that are compatible with Lotus software, which included Labtech Notebook.

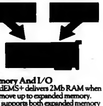
Real Time Access will ship in July. It is scheduled to rise in price to $295 in October. The menu-driven program runs on IBM Personal Computers and compatibles with at least 512K bytes of random-access memory.

In addition to 1-2-3, Real Time Access is compatible with many popular applications such as Lotus' Symphony, Ashton-Tate's Dbase III and Mathsoft, Inc.'s Mathcad.

The package also is compatible with a wide range of vertical and custom-written applications, according to the vendor.

Both Real Time Access and Notebook are available through IBM's direct sales force under the Labtech logo. Approximately 2,500 copies of Labtech Notebook have been shipped so far, Putnam said.

Major corporations such as Polaroid Corp., Ford Motor Co. and Standard Oil Co. are currently using Labtech Notebook.



Cygnet delivers electronic mail retrieval program

By Peggy Watt

SUNNYVALE, Calif. — Microcomputer and MIS managers are at the top of the list to receive complimentary evaluation copies of a new memory-resident communications program, Get, which began shipping last month from Cygnet Technologies, Inc.

As part of a telemarketing promotion, Cygnet has already sent out about 100 copies of the $89.95 package to MIS managers at Fortune 1,000 companies, according to Ken Dickens, marketing director.

According to Dickens, early tests showed that the use of Get doubled or tripled the use of electronic mail in the office.

The 64K-byte package runs on IBM Personal Computer and compatible systems, in background, checking designated electronic mail services at times specified by the user.

If messages are waiting, Get flashes a message in one corner of the screen without disturbing other applications running at the time. The user can then retrieve the message.

Get includes a text editor and autodial and file transfer capabilities. Access can also be protected by password.

The program comes with interfaces for MCI Communications Corp.'s MCI Mail, Western Union Co.'s Easylink, ITT's Dialcom, Readers Digest Association, Inc.'s The Source, Compuserve, Inc.'s Compuserve, General Electric Information Systems Co.'s Quickcom and Genie, GTE Corp.'s Telemail, Tymnet Inc.'s Ontyme, AT&T's Mail and other commercial services.

The product can also be programmed to search for and retrieve messages from such other on-line services as bulletin board systems or corporate in-house electronic mailboxes.

Get is a spin-off of the Cygnet Cosystem, a computer with built-in utilities and telecommunications capabilities. The Cosystem has moved slowly in the marketplace, and Cygnet has split off several of its pop-up utility programs and sold them separately.

SYSTEMS & PERIPHERALS

HARD TALK
James Connolly

Don't count out mainframe

Could this be the start of something big? Or, to be more precise and to twist the words of the old song a little more, could this be the start of something small?

There are people on both the user and vendor sides of the computer industry who gleefully point at the less-than-spectacular annual and quarterly financial results of mainframe vendors as proof that the mainframe is dead. Those are the people who swear that the personal computer and its associates — the local-area network and departmental processor — have knocked the mainframe into its grave.

But those people are wrong or, at best, premature. They are just as wrong as the mainframe folks were five years ago with their flat declarations that the PC was a toy with no place in the American corporation.

The statistics most frequently cited as proof of the mainframe market hardships are IBM's comparatively weak, revenue and earnings numbers for recent quarters. And, of IBM's numbers, perhaps the most critical are the seemingly disappointing order rates for the 3090 series of mainframes. According to International Data Corp. market research figures, worldwide large-scale unit shipments dropped by 13.6% in 1985, despite the start of 3090 shipments.

Some of the blame for the lack of interest in the 3090 may rest with IBM, which has been criticized by users and analysts for not distinguishing the

See **DON'T** page 46

Connolly is Computerworld's *senior editor, systems & peripherals.*

Minis aid firm's expansion

Keeping system abreast of 30%-per-year growth

By Donna Raimondi

LA FOX, Ill. — Richardson Electronics Ltd. scoops up market share in a trailing-edge technology as it produces and sells electron tubes and power semiconductors.

While Richardson's earnings have grown at an average of 30% per year for the past five years, the company's information systems have kept pace and enabled expansion using Pick Systems' Pick-based McDonnell Douglas Computer Systems Co. minicomputers.

A combination of slow but steady growth in the tube market — about 5% a year now — and a dwindling number of companies that produce tubes has helped fuel Richardson's growth. Four years ago, Richardson was a $25 million company running with 25 employees.

The entrepreneurial Edward Richardson, son of Arthur Richardson who founded the company in 1947, took over the reins in 1961, says Eric Powell, vice-president of information systems. Today, $70 million in sales and approximately 430 employees attest to the success Ed Richardson achieved through his policy of growth by acquisition. This started in the early 1980s, when he became concerned about having sources of supply for the tubes that he sells.

As the company grew, the information systems department had to continually grow and change to support it. "Before, we had a Singer System 10 batch computer, and we had Ed Richardson. Ed did the planning, and the computer did the keeping track of everything," Powell says.

Now, a recently installed hierarchy of executives relies upon the McDonnell Douglas (formerly Microdata Corp.) M9208 and M9250 systems that run under the McDonnell Douglas' Reality operating system. Seven locations in the U.S. and sites in Canada, the UK and France are connected to the systems via leased lines. In the U.S. and Canada, the company uses an all-digital network connected through Teltone Corp. switching multiplexers. "In the UK and France, we are using conventional analog lines," Powell says.

The communications scheme has helped

See **MINIS** page 50

Inmos unveils 16-bit Transputer for low-end parallel processors

By James Connolly

BOSTON — Inmos Corp., the company that produced the 32-bit Transputer used in Floating Point Systems, Inc.'s FPS T series of supercomputers, recently announced a series of evaluation products based on a 16-bit Transputer designed to be the key processing component in lower-cost parallel processing systems.

Inmos said its IMS T212, announced in Boston, executes up to 10 million instructions per second (MIPS). Inmos' earlier Transputer, the IMS T414, was introduced in October 1985 and is the key processor in Floating Point's massively parallel T series systems.

Like the IMS T414, the IMS T212 reportedly features 2K bytes of 50-nsec, on-chip, static random-access memory, an external memory interface and four inter-Transputer links that allow multiple transputer connections. Scheduled for shipment in June, the IMS T212 costs $400.

Other products announced by Inmos included the 10-MIPS IMS M212 disk processor, for $300, and the IMS C011 and IMS C012 link adapters, which cost $35 and $50, respectively, and are designed to connect Transputers to other manufacturers' peripherals and processors.

Inmos, which is based in Bristol, England, and has a research facility in Colorado Springs, also introduced its Inmos

See **INMOS** page 49

INSIDE

NEW THIS WEEK

- Lee Data offers a plug-compatible replacement for IBM's 3178 interactive terminal
- For more on this and other new products, see pp. 85-113.

INSTANT ANALYSIS

"Giants like IBM and DEC can cover many service strategies and, therefore, concern themselves with molding their offerings to meet individual customer needs."

— Input market research report on maintenance

Alcyon ships line of VMEbus-based multiuser systems

Real-time supermicros run Unix V.2 software

By Eddy Goldberg

SAN DIEGO — Alcyon Corp. recently began shipping a new line of VMEbus-based, real-time, multiuser Unix systems. The 10 supermicros consist of five models, each available in single- or multiprocessor configurations.

The systems can be adapted by OEMs for technical, real-time applications in markets such as factory automation, data communication and medical instrumentation.

The systems support from one to 16 users, with disk capacity from 20M bytes to 450M bytes and a number of I/O options. Alcyon's A68VME single-board computers are based on the VMEbus standard and the Motorola, Inc. 68010 processor. The A68VME reportedly runs at 10 MHz with no wait states.

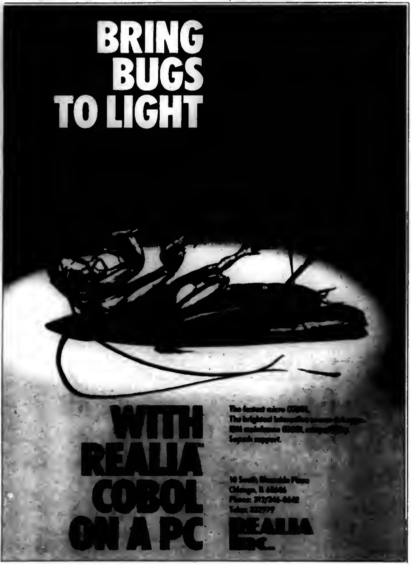
Alcyon also provides its Regulus operating system, which is AT&T Unix System V.2-compatible and is built around a real-time, multitasking kernel. For applications requiring faster real-time response than is offered by the Regulus system, Alcyon offers a faster real-time kernel on a second board.

The VMEbus multiprocessing system allows developers "to distribute tasks across nodes and add application software without having to make system software decisions," said William Hughes, vice-president of sales and marketing for Alcyon. He added that in the multiprocessor configurations, one processor can be dedicated to a single task, guaranteeing reponse in a real-time, nonrepeating situation.

Alcyon also sells other software tools including C language compilers and its Distributed File System. DFS is a software package consisting of upwardly-compatible extensions to Regulus to support the interconnection of computer systems via a local-area network.

Alcyon also provides optional software such as Fortran 77 and Pascal-2 optimizing compilers, a C language debugger, AT&T Unix System V utilities and a number of application packages.

Prices start at $7,490 for the single-processor Model 20 and $11,990 for the multiprocessor Model 20-MP, which support one to two users. At the high end, the Model 450, which supports 12 to 16 users, is priced at $45,490, while the multiprocessor Model 450-MP sells for $49,990.



Don't count out the mainframes

From page 45

3090 from its predecessors with features that make customers jump at the chance to own one.

With the talk that departmental systems and PCs are going to replace the mainframe, it may appear that the supplantation has begun. But there remains the question of whether there is a market for departmental systems. Also, there is the question of whether the true role of the PC is to take over the processing from the mainframe. It would be interesting to see how many of the PCs sold each year are replacing mainframe-type terminals while retaining access to the mainframe. Is the PC anything more than a very smart terminal?

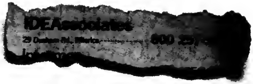
Also, it may be that the primary use of departmental processors will remain for special applications such as computer-aided design. Lately, analysts have begun to say that the key element of departmental processing — office automation — should be a function of a divisional processor. It may be to that market, targeted by superminicomputer manufacturers, that the mainframe will lose the corporate customer.

There probably always will be a need for the large batch or data base system, particularly if PCs create the demand for mainframe support that some observers claim.

But if there is need for a distributed data base and for keeping the price of one million instructions per second (MIPS) of power under $100,000, then maybe users and vendors are justified in looking closely at the supermini. A 6-MIPS machine may be right to run an integrated office package and applications to support one division of a Fortune 500 company. However, even with that local processing, there still will be the need to access a host's data base for the exceptional request.

It is ironic that what the supermini is offering for power is comparable to what the mainframe offered a couple of generations ago. In the late 1970s — with IBM's 3033 — a high-end system sat in the 6- to 9-MIPS range, rather than the 28-MIPS range they occupy today.

So the dip in the mainframe market may be the result of a sluggish economy, or it may be because the 3090s haven't wowed people. Or, it may just be the start of something big — not what the low-end advocates think it should be, but a reliance on the same scale of system that was a star a few years ago.



For the next generation of 3X communications, call the number on the right.

When you want to connect your IBM PC to your System 34/36/38, whom should you call?

Call the people on the right and you can emulate the most terminals, including the 5250 (with all 32 display attributes) and the 3180. You can support the latest laser-jet printers, the largest range of system printers, and the most up-to-date file transfer packages on the market—even IBM's. You can do windows and cluster with three other IBM PC's from your workstation. Most important, should you ever need help, the toll-free number on the right will put you in touch with a technical support team whose sole priority is to master PC based products.

Now call the people on the left, and you can emulate some terminals, a limited number of system printers, and not all of the 5250 display attributes. Of course you'll be able to work with IBM file transfers, but once the goods are delivered, can you work with virtually no support of PC based products?

So before you call the number on the left by force of habit, consider who's really giving you the best solutions in 3X communications. And ask yourself this.

Who should be emulating whom?

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Computer service market to grow; vendors' share to increase

Almost 90% of the $13 billion computer maintenance and support market is owned by the hardware manufacturers themselves, and it looks like those vendors will grab even more market share. Those were the findings of an **Input** study of the service market.

Input, a Mountain View, Calif., market research firm, says that the service market will continue to grow and that the hardware vendors' market share will grow even larger.

In addition, the report notes that some smaller vendors have begun offering innovative services, ranging from a heavy reliance on user involvement in service to reliance on redundant circuits.

HARDWARE NOTES

■

The U.S. Department of Commerce's **National Bureau of Standards** has published a guide entitled *Care and Handling of Computer Magnetic Storage Media*. The 130-page book outlines how to maintain proper environmental conditions as well as how to handle tapes and disks.

It looks at how extreme environmental conditions and magnetic fields affect storage media, examines the chemical factors involved in storage and lists some of the precautions to take for long-term archival storage.

The publication is available from the U.S. Government Printing Office in Washington, D.C., at a cost of $5.50.

■

Memorex Corp. has announced a program that offers increased capacity and peformance to customers who lease or purchase the company's 3680 or 6240 High Density Package disk drives.

The program allows 3680 or 6240 customers to upgrade to future products — a double-capacity disk drive and the 3888-23 disk cache controller, respectively — or to obtain an equivalent configuration of their existing system at any time at a predetermined price.

■

Zero One Systems, Inc. has completed installation of a **Cray Research, Inc.** X-MP/48 supercomputer at the National Aeronautics and Space Administration's Ames Research Center in Mountain View, Calif. The system, valued at $21 million, will be used for large-scale fluid dynamics, aerodynamic design and analysis, atmospheric modeling and satellite image processing. It currently serves up to 500 users running 1,500 jobs per day.

The X-MP/48 is the third upgrade, following the installation of a Cray 1S in 1981 and a Cray X-MP/22 in 1983.

■

Another **Cray Research, Inc.** X-MP/48 is being delivered to the **Pittsburgh Supercomputing Center**, a consortium composed of Carnegie-Mellon University, the University of Pittsburgh and Westinghouse Electric Corp., according to Cray Chairman John Rollwagen. The X-MP/48 at the Monroeville, Penn., site should be operational this month.

■

Honeywell, Inc. and data base computer manufacturer **Teradata Corp.** have signed an OEM contract under which Honeywell will integrate Teradata's DBC/1012 with Honeywell's large-scale computers. The contract is a four-year, nonexclusive marketing and distribution agreement. No delivery date has been announced.

■

NCR introduces plotter aimed at CAD systems

Follows 3M with 4300 CAD/COM

By James Connolly

MOUNTAIN VIEW, Calif. — NCR Corp.'s Micrographics Systems Division has introduced an aperture card plotter designed to handle computer-aided design (CAD) plotting on computer-output micrographics (COM).

NCR's announcement of its 4300 CAD/COM is the second such debut in recent months, following 3M Corp.'s March introduction of a laser film plotter.

The 4300 CAD/COM was designed to be a higher speed alternative to standard paper plotter outputs. It records a digitized image directly from a CAD workstation onto an aperture card, eliminating the need for a paper plot prior to microfilming.

According to NCR, the 4300 CAD/COM plots with an accuracy equivalent to a high-quality 200 dot/in. paper plot. The company also said that images are processed and indexed in less than three minutes. The system includes a printer designed to produce eye-readable titles across the top of the card for filing and sorting.

The 4300 CAD/COM was designed to interface with nearly all CAD systems via a Versatec, Inc. or compatible processor and can be adapted for use in a personal computer environment. It uses a dry silver film that is intended to eliminate the need for chemicals.

The system is 13-in. high by 37½-in. wide and 18-in. deep. It will be sold through third-party channels at prices ranging from $38,000 to $45,000, depending on the configuration. Deliveries are scheduled for late this year.

Firm claims 'breakthrough' in thin-film manufacturing

By David Bright

SANTA CLARA, Calif. — Information Memories Corp. recently announced what it terms a "significant breakthrough" in the manufacture of thin-film-plated media for hard disk drives.

The new K-2-S process should result in lower 3½-in., 5¼-in. and 8-in. disk drive prices and greater disk drive accuracy, according to marketing manager Mary Eckert.

Information Memories, a subsidiary of Xebec Corp. of San Jose, Calif., supplies hard-disk platters to drive manufacturers such as Syquest Technology and Maxtor Corp. So far, the platters have been coated with a sputtered carbon layer. Sputtering is a dry, vacuum method of coating the platters, while the K-2-S process applies a wet coat.

K-2-S is less costly than the traditional sputtering method and creates a thinner coating at least as durable and corrosive resistant, Eckert said. This month, Information Memories should be sampling products created with K-2-S, she added.

While Eckert is hopeful that drive manufacturers will take advantage of the process, K-2-S has yet to attract much attention. Officials at two potential client companies declined comment until they evaluate the product. Analyst Bob Katzive, who follows the disk drive market for Disk/Trend, Inc., said he did not know about the company's activities. He said Information Memories' field is crowded with more than 20 players worldwide.

Britton-Lee to use IBM drives

By James Connolly

LOS GATOS, Calif. — Relational data base management system manufacturer Britton-Lee, Inc. plans to use IBM disk drives in its series of data base machines scheduled to be announced during this month's 1986 National Computer Conference.

Britton-Lee officials said that under a recent letter of intent, IBM's newest Winchester disk drives will be incorporated into Britton-Lee's Relational Server series. The RS300 series consists of data base machines designed for office automation environments and includes the RS350, which is scheduled for an NCC introduction.

"Since our products are now being heavily deployed in on-line transaction processing and corporate decision support applications, it is only natural for Britton-Lee to have the most reliable disk repository integrated into our data base machines," according to Peter Story, Britton Lee's vice-president for marketing.

Inmos unveils Transputer

From page 45

Transputer Evaluation Module 400 (ITEM 400). The ITEM 400 costs $50,000 and reportedly allows evaluation of a 400-MIPS, 40-transputer system. It includes a power supply and card cage module, 10 IMS B003 boards incorporating four IMS T414s per board and the IMS D701 Transputer Development System, which operates on an IBM Personal Computer XT or AT and includes Inmos' Occam 2 compiler.

In addition, Inmos introduced the IMS B006 Evaluation Board, priced from $1,750, which allows evaluation of the IMS T212, and announced the IMS B007 Graphics Evaluation Board, which costs $4,200 and allows evaluation of the T414's graphics capabilities.

Minis aid in firm's expansion

From page 45

drive the growth of information systems services, Powell says. But the Reality systems themselves have been critical in allowing the information systems to grow or change in response to the booming business. For example, in March, Richardson Electronics inked a pact with Varian Associates, Inc., a leading manufacturer of electron tubes, to distribute Varian's products.

Richardson agreed to provide all accounting for the joint venture. The company had to implement new kinds of general ledger generation and reporting. It also had to write a program to allow Varian customers to buy equipment with whatever currencies they wanted, since Varian already allowed its customers to do. Both of these complex systems, which are exception systems in that the non-Varian parts of the business do not use them, were put in place in about two months, according to Powell.

"We exist in an almost utopian data base," Powell says. "One piece of data will exist in one place only." Users can reference that piece of data even though it is in another file because the data base is relational.

In the past two years, the information systems department has grown from two to nine employees. The original two kept a highly structured accounting of everything that was done, and the company insists on that kind of work from the newer programmers and analysts. "We say to the staff, 'You must follow all of our conventions, otherwise you redo it,' " Powell says. "That has made it a lot easier for us to make massive changes."

Almost all programming is done in-house. The programmers work in an enhanced version of Basic called Data-Basic and use the built-in inquiry language English. "The Reality operating system forces you to be in and to operate in a relational data base, so everthing we have is data base oriented. We make major changes almost every week," Powell says. Reports generated with English generally take fewer than 15 minutes to design, he adds.

The company rapidly outgrew its first 32-user Reality system, which had been bought from one of the first companies acquired four years ago, Powell says. "We quickly found out the potential for revenue generation on the system," he adds.

The company operated as two divisions when the first Reality system came on board. The two parts were inadvertently in competition with each other. They operated under different names and at different locations, but had identical products, availability and cost. Customers would get a price from Richardson's Chicago division then call the New York division and sometimes get a lower price.

"We were losing potential profits by not having information available to both divisions. So we put terminals in the other division and developed a system for inputting quotes and a ready-access system, which is really the heart of our system now," Powell says.

The ready-access system, written in-house and called Master Inquiry, gives fast access to customer, sales, quote, vendor, cost, inventory, stock, status and accounting information. The immediate result of its implementation was that the two divisions were able to set standard pricing and not out-bid each other for their customers' business.

As more acquisitions and bigger distribution agreements with other suppliers expanded Richardson, the company quickly went from the initial 128K-byte system to a newer model with 1M byte of main memory and 56 ports. That system was upgraded again to an M9208 with 6M bytes of memory, 1G byte of disk and 208 ports.

Another system, an M9250 with potential for more than 200 users, is working now as a backup developmental system. It will soon become an inquiry-only system as the company breaks up into two kinds of end users: updaters and inquiry-only.

Updaters are order entry, purchasing and inventory control people. Inquiry-only personnel look up customer history information, such as how much a customer was charged for a particular product the last time he ordered it. This dual system is a temporary solution to a need for a bigger computer.

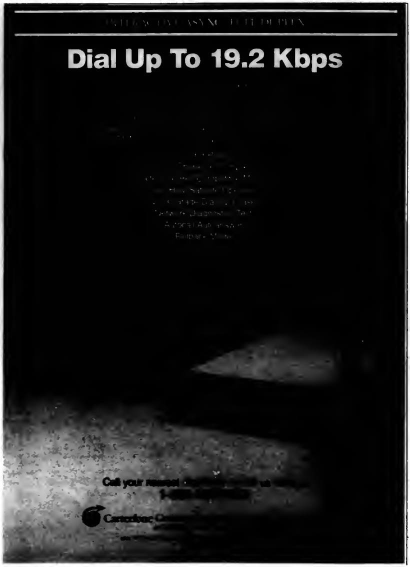
Promised first model of 400-user system

McDonnell Douglas has promised Richardson the first model of a new 400-user system by June 1, 1987, Powell says. When that happens, the two existing systems will be traded in and all work will be performed on the new one.

"As we have grown from about $25 million a year four years ago to probably $70 million this year, we are getting orders out in roughly the same length of time. We ship 98% of the orders — about 550 a day — the same day that we get them," Powell says.

One of the information system's main projects is to provide reporting, planning and budgeting information to the newly organized business structure. In the old days, everybody reported to Ed Richardson, who remains as chief executive officer. Now, a new president presides over seven vice-presidents, each of whom controls several operating groups.

"All of the VPs take an active role in their departments, and they take an active role in operating the computer to the extent that they need to in order to function in their jobs," Powell says. "So they all have terminals on their desks."



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Product Spotlight

Edited by Barbara Wierzbicki

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INSIDE

New word processing vistas: Networking, portability and integration/54

User profile: Moving from dedicated systems to micros/60

Comprehensive chart of micro-based word processing programs/61-68

Word processing
PCs taking over from dedicated systems

By SHAWN BRYAN

There really is some very good news for people looking for word processing software. With few exceptions, there are personal computer packages available ranging from economical programs that perform basic tasks to full-featured offerings that can run circles around the best dedicated word processing systems for half the price. You could say it is an embarrassment of riches.

The "no-frills" word processors — a misnomer because many no-frills packages have grown into very capable products — earn their keep by being relatively easy to use. "No frills" does not necessarily mean you have to give up functionality, just that the number of functions is more limited. A $200-or-less word processor should include standard functions such as an 80-col. display, word wrap, centering, right and left justified margins, insert and delete, search and replace, moving blocks of text and automatic reformatting. Many popular no-frills packages — such as Software Publishing Corp.'s PFS:Write, IBM's Writing Assistant and Lifetree Software, Inc.'s Volkswriter — provide users with all the features needed to perform basic word processing. If ease of use and a reasonable price tag are priorities, then the lost capability may well not be worth either the cost or the learning time involved in using a full-featured program.

Most good software can swap files with other good software. It may be better to offer a choice than to make a decision that satisfies no one.

At the other end of the spectrum are the full-functioned word processors. These programs, generally ranging from $300 to $700, offer just about every conceivable option (indexing, footnotes, end notes, math capabilities, table of contents generation, multiple columns and so on). Such full-featured contenders are replacing dedicated word processing systems at a fast clip. These products include Multimate from Multimate International Corp. (recently acquired by Ashton-Tate), Wordperfect from Wordperfect Corp., Wordstar 2000 from Micropro International Corp. and Microsoft Word from Microsoft Corp.

The relative flexibility and plummeting prices of PCs make them a natural choice when installing new word processing stations. Manufacturers of dedicated systems like the IBM Displaywriter — now discontinued — find demand for their sys-

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Bryan is chief financial officer of Cabot Cooperative, a dairy manufacturing company in Cabot, Vt. He is also president of Datatek, a consulting firm specializing in small computer systems design and implementation.

PCs overtaking dedicated word processing systems

Continued from previous page

tems vanishing as better and better software elevates PC word processing capabilities.

The strongest argument to be made for traditional systems is that they are dedicated to the sole task of word processing. To that end, their keyboards are customized for their single-purpose application. Keys are labeled, and often a single keystroke accomplishes what requires multiple keystroking in a micro-based package. Personal computers, on the other hand, can perform a number of tasks, in addition to word processing, that are not possible on dedicated systems. PC users can now achieve equivalent word processing capability plus run thousands of other software applications programs including spreadsheet, data base management and business graphics. You don't get dedicated keys, but you don't get single-purpose hardware and software either.

There is, of course, a price to be paid for these feature-laden micro packages. Squeezing the capabilities of a dedicated system into a PC program means compressing all the functions into a keyboard that is, of necessity, generic. Manufacturers circumvent this problem — albeit sometimes in a cumbersome way — through the use of menus or multiple keystroke combinations. The IBM keyboard, for example, has 10 or 12 function keys that, coupled with the Alt, Shift and Ctrl keys, give you up to 48 possible keystrokes for calling up special features.

Dedicated word processing may still have its place, but it cannot be cost-effective in most situations. The $12,000 price tag attached to a dedicated word processing system is dizzying in comparison with that of a personal computer — fully equipped with printer, memory, high-resolution color monitor and so on — for about $6,000.

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> ***The price tag attached to a dedicated word processing system is dizzying in comparison with that of a personal computer.***

Every quest for a good word processing package begins with a shopping list of required features and capabilities. The following universal questions should be answered before making any word processing purchase. These standard queries will trigger additional questions specific to your particular environment:

- Program support. Does the manual have a good tutorial with real examples? Does the tutorial take you through the program in stages, or do you have to try to learn everything at once? Are the program examples realistic, and do they help you learn to use the program or do they teach you things you will never use? Does the manual have a good index and a good table of contents? Can you find specific information in a hurry, and is the information explained in an understandable way?

Is there an on-line Help system? Does the on-line Help system offer specific help or vague generalizations? When all else fails, is there a program support facility at the manufacturer's company staffed by knowledgeable people? What are the program support options? Is there a toll-free telephone line? Is there free support or is the help by subscription? Do you get swift, accurate responses to your questions?

- Performance. How many keystrokes are required to accomplish common tasks like block moves and copies, search and replace and deletions? How many keystrokes does it take to scroll from one end of the document to the other? From the top to the bottom of the page? And from one end of a line to the other? Are cursor movement and screen scrolling swift or sluggish? Can you move from word to word, paragraph to paragraph and page to page with only one keystroke? How does the program mark text that is to be acted upon? Does the program support monochrome and graphic displays of text? Do you get a good representation on the screen of what your document will look like when it is printed? How many lines are available on the screen for editing text and how many are used by the program for information display?

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New look at micro word processing: networking, porting and integration

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[illegible] future of word processing on microcomputers, [illegible] to look briefly at the state-of-the-art [illegible]

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[illegible] in avail- [illegible] of [illegible] Inc. [illegible] $900, [illegible] all other [illegible] and sophisti- [illegible]

[illegible] packages provide limited [illegible] capabilities in form-letter [illegible] functions are suffi- [illegible] to merit the title "records [illegible]"

Consultant Marshall

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> ***It has finally occurred to software developers that the basis for truly productive office computing is word processing.***

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[illegible] personal processing within [illegible]

Having made my case for the validity and [illegible]

[illegible] are the new [illegible] available to personal computer word processing? Three directions [illegible] be [illegible]

[illegible] Multimate and [illegible] just two of the many packages [illegible] enhanced to support PC [illegible] users.

[illegible] operating [illegible] ported Samna [illegible] Q-One [illegible] processing [illegible] is now available on DOS.

[illegible] applications. [illegible] + with a [illegible] Stepladder [illegible] Mailmerge, all [illegible] formerly separate packages. All functionality is available from the same menu and uses the same interface.

Similarly, Samna+ comes complete with a spreadsheet application, and Microsoft recently announced Word Release 3, which includes an outline processor much like Living Videotext's Thinktank or Ashton-Tate's Framework.

Xywrite, a word processing program from Xyquest, Inc., does not come with any other application, but it allows you to run any application — random-access memory permitting — from within the software on an interrupt basis.

Of the three directions, the third area is the most interesting. When word processing first came out, it was kept very separate from any sort of data processing function. And as new office functions were added to office systems, they, too, were kept separate from word processing. But now the lines of demarcation are fuzzy.

It has finally occurred to the software developers that most office applications are related and that the basis for truly productive office computing is word processing. ∎

Marshall, considered a leading authority on personal-computer-based word processing, [illegible] *consultant with Patricia Seybold's Office Computing Group in Boston. She is the author of Word Processing Software for the IBM PC published by McGraw-Hill, Inc.*

Continued from previous page

How many documents can you work on at once? Can you split the screen vertically? Horizontally? Both? How many keystrokes does it take to move from one document to another? How many keystrokes does it take to save a document? To recall one? How long does it take to save a document? How much memory does the program need? How much can it use? Can you customize your installation to take advantage of your hardware? Is there an unerase feature? Can you lose text accidentally? How many chances do you have to change your mind before text is gone forever? Are you warned when an action is irretrievable?

- Printing. How many printers are supported? How easy is it to install printers? Is there a customization program that allows you to install printers not now supported? How many printers can be installed at once? How are special printing characteristics shown? How are they entered? Can you print parts of the document instead of the whole thing? Can you print in the foreground and background — print one document while working on another? Can you print superscripts, subscripts, headers, footers, tables of contents, indexes? Will the program print columns of text? How long a page can you print? How wide?
- Import/export capability. What kinds of files can you import and export? How difficult is importing and exporting? Can it be done from within the word processor or do you have to run a special program?
- Special features. Is there a dictionary or spelling checker built in? Does it work on-line as well as in batch mode? Is there a style checker or thesaurus? Is there automatic hyphenation — can you turn it off? Is there an automatic file save or backup procedure? Is there a math capability? Can you merge several files? Is there a mail-merge feature? Is there a macro feature? Can you use boiler plate easily? Can you easily reformat documents? Can you import graphs into your text? Is there a line drawing feature?
- Trade-offs. Every program is a compromise. How do trade-offs between speed and ease of use, for example, affect your ability to get the work done? How well will the program hold up in the long haul? Will the menus get in the way? Will the lack of menus put people off? Will a program's lack of speed or difficulty of use become a problem? Will copy protection cause problems with a hard-disk system?

The manager trying to decide how to install word processing in his office faces a bewildering array of software choices. Perhaps the best known name in PC word processing is still Micropro's Wordstar. While Wordstar has seen better days, there are still countless users of this venerable product. Wordstar 2000 is a menu-driven, more friendly version but other products beat the program to the punch, most notably in the areas of speed and flexibility.

The first product to displace Wordstar was Ashton-Tate's Multimate. Multimate emulates the popular Wang Laboratories, Inc. dedicated word processing systems. In fact, it emulates Wang so well that Wang finally decided the lost market share was worth fighting for. They have released Wang Word Processing for the IBM PC, but it suffers when compared with the richer and better documented Multimate system, a product cloned from the same source. The Wang solution, however, offers connectivity with the vendor's VS and Alliance systems plus communications devices that work with other manufacturers' PCs. Thus Wang Word Processing for the IBM PC can work as part of a Wang integrated office solution while Multimate is more of a stand-alone selection.

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> ***The release of some spectacularly good integrated software threatens to make serious inroads into the stand-alone word processing software market.***

The Wang and Multimate systems both come with special keyboards. They move functions to single keys, eliminating the Alt and Ctrl key sequences used on standard PC keyboards. The Wang keyboard is mandatory, the Multimate keyboard is optional. The software-keyboard combination is effective for dedicated word processing, but some software takes control of the keyboard and assigns tasks to special key sequences. Such software may not work as well on these fancy keyboards.

The keyboards also offer a completely different touch. Touch is a matter of taste, but if the computer is to be used mostly for word processing, it is foolish to ignore the comments of the staff using the machine. Make sure you can live with them after the purchase. A lousy keyboard can make life miserable for the typist and the boss.

Both Multimate and Wang are page-oriented systems. This means they ssve each page as a separate file on the disk. The benefit of this method is that your word processing documents are backed up on disk page by page. If the power suddenly

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Software Dige
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RATINGS NEWSLETTER
Word Processing Programs
For the third year in a row, Software Digest Ratings Newsletter™ rated PFS:WRITE the best overall word processor for
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goes off, only the current page being edited is apt to be lost. The disadvantage is that there can be both page and document length limits that could prove restrictive if you tend to write novels instead of memos to your staff. The other drawback often cited for page-oriented word processors is that they are slow. That was true with floppy disks, but most computer systems today have sprouted hard disks and thus have eliminated the speed problem.

Memory-based systems such as Wordperfect keep the entire document — or as much of it as possible — in memory. The advantage is that the entire document is in random-access memory (RAM), the fastest part of your computer. The disadvantage is that RAM is temporary. If the power goes off and you haven't recently saved your work, you may find everything has evaporated. Most high-performance memory-based word processing programs offer an automatic backup option that will occasionally call a halt to operations, while it puts your work into a temporary file on disk. If the power goes off, the latest backup is available in that temporary file.

If you are purchasing a word processing program for a marketing department, you will undoubtedly find that graphics capabilities are important. There are several ways to approach this problem, depending upon your company organization. Large companies may have offset presses that can take information directly from a PC, provided it is properly formatted with the typesetting codes.

But even big firms can benefit from a single Apple Computer, Inc. Macintosh and laser printer. While still struggling to gain a solid reputation for number crunching with the gray-pinstripe-suit set, this machine rivals any other system for doing your own graphic arts work. Painting, graphs, charts and so on take on new meaning with a Macintosh and a laser printer. A significant problem with the Mac, however, is that connectivity with your host system may not be available. While Apple has promised connectivity improvement, the Mac is still not as well supported as other systems in this respect.

The IBM and compatible crowd is catching on, and Microsoft Word now offers some of the same graphics capability found on the Mac. Other products are also available that work with word processors to add a graphics touch, like Ashton-Tate's Graphlink, available with Multimate.

Another breed of software — the integrated program — further complicates word processing selection. The release of some spectacularly good integrated software threatens to make serious inroads into the stand-alone word processing software market. Integrated software — a term once synonymous with Lotus Devlopment Corp.'s 1-2-3 — now means everything from spreadsheet-based programs to fully independent software modules running under a common umbrella.

Enable from the Software Group and The Smart System from Innovative Software, Inc. are two that come immediately to mind. Each of these programs has a full-blown, built-in word processor. Enable uses an integrated software approach but manages to keep stand-alone power alive. The Smart System uses the separate program in a shell approach. Both products have 99% of the functionality of the dedicated systems, including spell checking, indexing, outlining and so on. The beauty of such software is that it is gracefully linked with other software applications — spreadsheet, data base management, graphics and communications — that all work harmoniously together.

Both Enable and The Smart System allow you to move from section to section like a skater on ice, flowing effortlessly from spreadsheet to data base to word processing, for example, to complete a mail-merge letter. Graphs can also be moved into your text and printed as part of your written message.

Another heavyweight that merits consideration in this group is Framework II, a much-improved version of the Framework program introduced by Ashton-Tate. Word processing in Framework II isn't quite as fancy as in the above programs, but the product includes some valuable features like automatic conversion of text fractions to decimal numbers when they are transferred to a spreadsheet.

If word processing is just one of many required capabilities on your PC systems, you may find reasonable alternatives in the new breed of integrated programs now available.

Last, if you have multiple personal computers in a network being used

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> ***The beauty of integrated software is that it is gracefully linked with other software applications — spreadsheet, data base management, graphics and communications — that all work harmoniously together.***

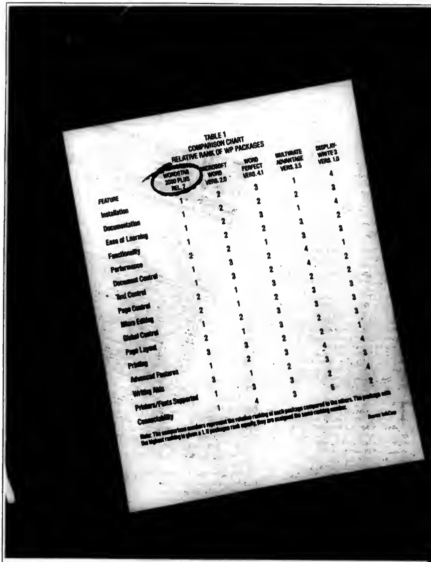

TABLE 1
COMPARISON CHART
RELATIVE RANK OF WP PACKAGES

FEATURE	WORDSTAR 2000 PLUS REL. 2	MICROSOFT WORD VERS. 2.0	WORD PERFECT VERS. 4.1	MULTIMATE ADVANTAGE VERS. 3.5	DISPLAY-WRITE 3 VERS. 1.0
Installation	1	2	3	1	4
Documentation	1	2	2	2	3
Ease of Learning	1	2	3	1	4
Functionality	1	2	2	3	2
Performance	2	2	1	3	3
Document Control	1	3	2	4	1
Text Control	1	3	2	4	2
Page Control	2	1	3	2	2
Micro Editing	2	1	2	3	3
Global Control	1	2	3	3	3
Page Layout	2	1	3	2	3
Printing	3	3	2	2	1
Advanced Features	1	2	3	4	4
Writing Aids	3	1	2	3	3
Printers/Fonts Supported	1	3	3	2	4
Connectivity	1	4	3	5	2

for a number of different chores, these products all sport — or claim to have in the works — versions that will run on networks. The only one I have actually seen working is The Smart System, LAN Version from Innovative Software.

Third-party selections dominate the market with the big manufacturers taking distant second and third places. The choice is further complicated by various host hardware installations that may not be conducive to shared resources with PCs. Because word processing often dictates sharing of information, not only with people but with other software and hardware, it is important to consider all the options when trying to make the best decision.

The first consideration, existing hardware, may be a moot point in some instances. In a Wang-powered office, for example, it may well make sense to stick with Wang-compatible word processing if you are moving to PCs. New communications releases from Wang make it possible to tie microcomputers from many manufacturers to a Wang host, and the company's recently released word processing program, Wang Word Processing for the IBM PC works as part of its total office system.

The Wang hardware devices include the Wang Local Office Connection and the Wang Remote Office Connection. The Local Office Connection allows an IBM Personal Computer or compatible to function as a workstation on a Wang VS host computer system. This hardware attachment allows connections to be made within about 2,000 feet of the host. It retails for $1,895 and includes the communications hardware and software, the Wang replacement keyboard and Wang Word Processing for the IBM PC.

The Remote Office Connection allows connection to a VS host system over point-to-point or multipoint synchronous links at up to 9.6K bit/sec. This hardware-software system extends the distances over which you can connect to the host and allows for file transfer between the host and a PC. The PC will also be able to use some of the facilities available on the host, like Wang Office Information System. This option includes a Wang replacement keyboard, word processing software, telecommunications card, diagnostic software, Wang Networking Software and an RS-232 cable for $1,200.

The same holds true in an IBM-powered office, where most likely Displaywrite on a host system holds a commanding lead over other options. Even if Displaywrite is not the best micro word processing program, familiarity with its style may make the transition to PC word processing simpler. If you stick with a known entity, people will be less threatened than if they are faced with learning to use an entirely new program.

Even within Wang and IBM environments, there exist many personal computer options because most of the better third-party word processing programs now offer conversion capability. If you are using word processing on your mini or mainframe, your consideration is usually fairly simple: Find a PC software product that includes file conversion utilities for the brand of large computer system and software you are using.

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> ***Get copies of the software you want to consider and set up some demo rooms. Let the people who will have to live with the purchase use the product.***

Multimate, Wordperfect and others include file transfer capabilities for many of the common formats now in use such as IBM's Document Content Architecture and Document Composition Facility. Some even offer custom transfer utilities for a fee.

A more mundane hardware consideration is the display monitor used on PC-based word processing systems. There are essentially three options. You can purchase a graphics display card and graphics monitor in either high or low resolution. High-resolution cards are fairly new to the marketplace, so make sure the software you are considering supports the display device. Lower resolution devices are almost universally supported but can be troublesome, because the resolution is not particularly good.

You will not find many programs that display text on the screen as it will actually appear on paper when using the lower resolution graphics adapters. Various tricks, like reverse video and different colors on a color display, are used to denote what the text will look like when printed.

Another option is to purchase a higher resolution monochrome display device that presents most text as it will appear. Unfortunately, these devices do not display graphs on the monitor, so you may be stuck if you use your machine to create graphic displays.

The third option is to purchase a monochrome display and a monochrome graphics card. These cards allow display of both graphs and high-resolution text. You can also purchase a combination of the above in a single board. Some hardware offers this capacity built in. If yours does not, these devices, such as the

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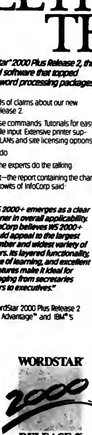

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Hercules Graphics Card from Hercules Computer Technology, Inc. are available from third-party manufacturers.

My recommendation for all serious word processing is monochrome, either amber or green. The higher resolution makes long hours at the screen bearable. If graphics are a real concern, the Hercules standard is almost universal, and excellent results can be achieved by combining a monochrome monitor and a Hercules card. It costs a little more and means a third-party board for your systems, but the money is well spent. In terms of software, you might look at either the Apple Macintosh or an IBM Personal Computer or compatible running the Windows and Word programs from Microsoft.

> ”
>
> ***Be realistic and remember that every software purchase is a compromise. The goal is to hit as close to the bull's-eye as possible.***

After establishing the desired micro configuration, you have to think about how the PC will work as part of the larger whole. In offices where a host computer does the heavy work, you will want to be sure you can tie the PC to the host system.

Getting information to your PC from the host for processing can be accomplished through asynchronous file transfer with a modem and dial-up port — the cheapest and slowest method — or by direct connection to your mini or mainframe. Many devices are now on the market that allow file transfer through terminal emulation. For example, AST Research, Inc. makes an IBM 3270 emulation board and software that permits connection from a PC to an IBM mainframe. Using this software and hardware makes the PC look like a 3270 dumb terminal to the host while retaining all the PC functionality on the other end.

In this instance, the PC appears to be a device the host system recognizes as a legal terminal. In many cases, the software supplied with such direct-connect hardware reconfigures the PC keyboard to take advantage of the many specialized keys available on more sophisticated terminal display stations. If you have such a machine, file transfer to your word processor is simple. Of course, you can still use the PC as a terminal on the host system to do word processing.

Let's say your office regularly uses an IBM 3081 as its host system — a fairly large computer requiring 3270 emulation. The office does a lot of production typing of a routine nature, drawing upon the name and address files in the mainframe for mass mailings to customers. The first problem is simple. Connectivity with the host is simplified by any one of several 3270 emulation products. You now have a PC that can talk to the host and get data from it. Since the typing is production work with a lot of repetition, you will want a word processing package that is strong on handling boilerplate as well as mail-merge activity. You will also want a program with sound conversion capabilities in order to be able to bring the names and addresses from the mainframe into the word processor. Multimate and Wordperfect are strong in both areas.

Once the information is on your PC, you can use the conversion utility to turn it into files understood by your PC word processor. The advantage of using these protocols is that spacing, tabs and other formatting information is not lost in the transfer process as it is in a straight ASCII download.

The toughest part of any evaluation process is devis-

Continued on page 60

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Source: Tony Liberoni, Manager of Operations and Systems, PPG Industries Chemical Group

MANTIS 1984

"100% of our new on-line development is in MANTIS."
Source: Luther Perry, D.P. Director, Santa Cruz County, CA

MANTIS 1985

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Source: Fred Lambrou, International Director of Information Services, General Foods International

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Continued from page 58

ing a method of judging what your needs are and then selecting the product best suited to addressing those needs.

A survey of existing chores is a logical first step. What is it people are doing, and how can that be automated? A simple and inexpensive word processing program may suffice for many routine typing chores. The larger programs have more power and flexibility but require more hand-holding. Overkill can be as dangerous as underkill, especially to a new user. Be certain you have accurately assessed the needs of the actual users of the system.

Also list any hardware constraints. This allows weeding out of programs that cannot pass muster with your host system or with your existing personal computers.

Now comes the time-consuming part. Get copies of the software you want to consider and set up some demo rooms. Let the people who will have to live with the purchase use the product. Get their feedback. It is an old sales technique, but if the user thinks he has a part in making the decision, he'll be happier with the purchase.

Be realistic and remember that every software purchase is a compromise. The goal is to hit as close to the bull's-eye as possible. Don't be afraid to standardize on more than one system. Most good software can swap files with other good software. It may be better to offer a choice than to make a decision that satisfies no one.

While the users are evaluating the software, you should be evaluating the vendor. You can buy software a number of ways — from the manufacturer, from a local dealer, from a mail-order house. Evaluate prices and support from your chosen method and compare with other vendors.

Once the decision is made and the software purchased, follow up with support if possible. Help install and start tutorial sessions. Some of the greatest productivity gains can be made in such repetitive tasks as word processing, where the same document is used over and over. Those gains may be lost forever if the introduction to the new machine and software is a painful one.

Also explore the workstation vs. the dedicated PC. Some personal computers are better shared, while others may be better left dedicated to a single, high-volume user. If the word processor is at someone's desk but part of a shared installation, that person will have to be displaced every time someone wants to use the machine. Soon the word processor will be gathering dust from a lack of use. Weigh the cost of two machines vs. the cost of shared resources.

Finally, and most important, continue to listen to the people using the programs. Stay current and pay attention to upgrades. Most reputable software firms will notify you of upgrades, and they will have a reasonable fee for the service. ■

University converts to micros

By [illegible]

Founded in 1889, the University of New Mexico (UNM) is the largest of the state's five publicly funded universities, with 24,000 students on five campuses and 2,000 faculty and support staff.

From the day IBM's Magnetic Tape/Selectric Typewriter was first announced in the mid-1960s, the university has used a wide variety of word processing equipment. Today, UNM has more than 150 dedicated word processing systems from [illegible] vendors including IBM, Wang Laboratories, Inc. and Xerox Corp.

Current equipment, tight budgets and an investment in data and programs on existing systems dictate that integration approaches must involve the use of equipment already in place. The effort to connect and share data between a wide variety of equipment has been ongoing at the University of New Mexico's main campus in Albuquerque for the past several years.

In the late '70s, UNM decided to connect its several thousand computer terminals, microcomputers and dedicated word processors to six Digital Equipment Corp. VAXs and an IBM 3084 Model D with a single network. The goal was to link administrative and academic terminals to all major university computers; to permit document interchange, messaging and calendaring; and to allow easy data file interchange.

To that end, dedicated systems are being gradually phased out at UNM and replaced by microcomputers. Conversion is being aided by IBM's Document Content Architecture, which allows documents to be moved from dedicated systems to microcomputer with formatting commands intact. This move from dedicated systems to "open" microcomputer systems follows a recent International Data Corp. report on text processing, word processing and electronic typewriters, which stated, "The idea of multifunctionality continues to be the most important concept in the word processing market place."

To lay the groundwork, UNM chose Ethernet. Installation of this broadband network is nearly complete across the 600-acre main campus, allowing terminals easy access to the DEC systems, which are used for academic computing, and to the IBM mainframe, which serves administrative needs. Microcomputers use Polygon Associates, Inc.'s Poly-TRM software for emulation of the DEC VT100 when accessing the network.

To deal with its long-term objectives, UNM developed a purchase and support policy to provide a guarantee to user departments that equipment purchased would fit into the long-term plans of the university. The policy provides some control by limiting purchases to a roster of products that have been pretested by the Microcomputer Support Group for compatibility.

The Microcomputer Support Group provides a variety of services, including configuring and pricing systems, a user hot line, on-site support and application development tips and user training.

For UNM, the rest of this decade will be one of consolidation and conversion to microcomputers with open architectures. Such a move will help prevent being locked into a specific integration concept and thus lengthen the useful lifetime of the university's integrated computer system investment. ■

[illegible] is an office automation consultant based in Albuquerque, N.M.

PC WORD PROCESSING SOFTWARE

Vendor/Product	Maximum Memory Required (in bytes)	Menu Driven	Spelling Checker	On-Line Dictionary	Automatic Indexing	User-Definable Macros	Column Move	Outlining Capabilities	Mail-Merge Capability	Creates ASCII File	Price
Airus Corp. Suite G5 10200 S.W. Nimbus Ave. Portland, Ore. 97223 *AI: Typist*	256K	Yes	Yes	No	No	No	No	Yes	Yes	Yes	$99 95
Analytical Software, Inc. 10939 McCree Road Dallas, Texas 75238 *Executive Assistant*	128K	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	$150
Ann Arbor Software 407 N. Main St. Ann Arbor, Mich. 48104 *Textra 3.1A*	256K	Yes	No	No	No	No	No	No	No	Yes	$29.95
Arrays, Inc. 6711 Valjean Ave. Van Nuys, Calif. 91406 *Windoword*	256K	Yes	No	No	No	No	Yes	No	Yes	Yes	$149.95
Beaman Porter, Inc. 417 Halstead Ave. Harrison, N.Y. 10528 *Powertext 2.1*	128K	Yes	Optional	Yes	Optional	Yes	Yes	Yes	Yes	Yes	$399
Businessoft Corp. Suite M-4 703 Giddings Ave. Annapolis, Md. 21401 *Mind Reader Version 2.0*	256K	Yes	Yes	Yes	No	Yes	No	No	Yes	Yes	$189
Chang Laboratories, Inc. 5300 Stevens Creek Blvd. San Jose, Calif. 95129 *Memoplan*	128K	No	No	No	No	No	No	No	No	Yes	$295
CIM Software 1395 Main St. Waltham, Mass. 02154 *Techwriter*	256K	Yes	Optional	No	Yes	Yes	Yes	No	Yes	Yes	$595
Command Software Corp. Suite 1 1360 N. Main St. Walnut Creek, Calif. 94596 *Commandwriter II*	256K	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	$150
Computer Associates International, Inc. 2195 Fortune Drive San Jose, Calif. 95131 *Easywriter I*	128K	Yes	Yes	Yes	No	No	No	No	Yes	Yes	$195
Computer Associates *Easywriter II System*	192K	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	$395
CYMA/McGraw-Hill 2160 E. Brown Road Mesa, Ariz. 85203 *Final Draft*	256K	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	$199
DAC Software, Inc. Suite 1108 4801 Spring Valley Road Dallas, Texas 75244 *DAC-Easy Word*	256K	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	$49.95
Emerging Technology Consultants, Inc. 4760 Walnut St. Boulder, Colo. 80301 *The Professional Writer's Package*	256K	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	$490
Friendlysoft, Inc. 3638 W. Pioneer Pkwy. Arlington, Texas 76013 *Friendly Writer*	128K	Yes	Yes	No	No	No	No	No	No	No	$89.95

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from the vendors.

CW chart compiled by Christie Sears.

Product Spotlight/PC Word Processing Software

Vendor/Product	Minimum Memory Required (in bytes)	Menu Driven	Spelling Checker	On-Line Dictionary	Automatic Indexing	User-Definable Macros	Column Move	Outlining Capabilities	Mail-Merge Capability	Creates ASCII File	Price
Gamma Productions, Inc. Suite 102 817 10th St. Santa Monica, Calif. 90403 *Multilingual Scribe*	320K	No	No	No	No	No	No	No	No	No	$184
Handle Software, Inc. 400 Patterson Plank Road Carlstadt, N.J. 07072 *Word Result*	128K	Yes	No	No	No	Yes	No	No	Yes	Yes	$129
Handle Technologies, Inc. Suite 900 7500 San Felipe Houston, Texas 77063 *Handle Write/Spell*	512K	Yes	Yes	No	No	No	Yes	No	Yes	Yes	$395
Hewlett-Packard Co. Contact local HP sales office *Advancewrite I*	640K	Yes	No	No	No	No	Yes	Yes	No	Yes	$295
Hewlett-Packard *Advancewrite II*	640K	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	$550
Hewlett-Packard *Advancewrite III*	640K	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	$695
MPK Software, Inc. Old Danbury Road Danbury, N.H. 03230 *Professional Qwerty*	128K	No	No	No	No	No	No	No	Yes	Yes	$149
IBM Contact local marketing representative *Writing Assistant*	128K	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	$165
IBM *Displaywrite 3 Version 1.1*	256K	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	$450
Image Processing Systems 4414 Regent St. Madison, Wis. 53705 *Proofwriter 2.33*	256K	No	Yes	No	No	Yes	Yes	No	Yes	Yes	$250-$475
Infonetics, Inc. 13 Woodland Ave. Verona, N.J. 07044 *Galen's Scribe*	128K	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	$495
Innovative Software, Inc. Suite 380 9300 W. 110th St. Overland Park, Kan. 66210 *Smart Word Processor*	256K	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	$395
Leading Edge Products, Inc. 225 Turnpike St. Canton, Mass. 02021 *Leading Edge Word Processing*	256K	Yes	Yes	No	No	Yes	No	No	Yes	Yes	$100-$195
Lexitronics, Inc. Suite 14 101 E. Holly Ave. Sterling, Va. 22170 *Lexitype*	256K	No	Yes	Yes	No,	No	Yes	Yes	Yes	Yes	$505
Lifetree Software, Inc. Suite 315 411 Pacific St. Monterey, Calif 93940 *Volkswriter Deluxe 3*	256K	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	$295
LJK Enterprises, Inc. 7852 Big Bend Blvd. St. Louis, Mo. 63119 *Simply Perfect*	128K	Yes	Yes	Yes	No	No	No	No	Yes	Yes	$169.95
LM Software P O. Box 93 Belmont, Calif 94002 *Macspec*	128K	Yes	No	No	No	Yes	No	Yes	No	Yes	$199.95

Corporate Maneuver.

In the high-pressure corporate environment, every move counts. It's no wonder, then, that many corporate PC users are reaching for WordPerfect for powerful business word processing.

Reaching the top.

WordPerfect is now the best-selling word processor for the IBM PC, according to market research firm InfoCorp. And customers like Ford, Chrysler and TRW are leading the way.

Meeting user needs.

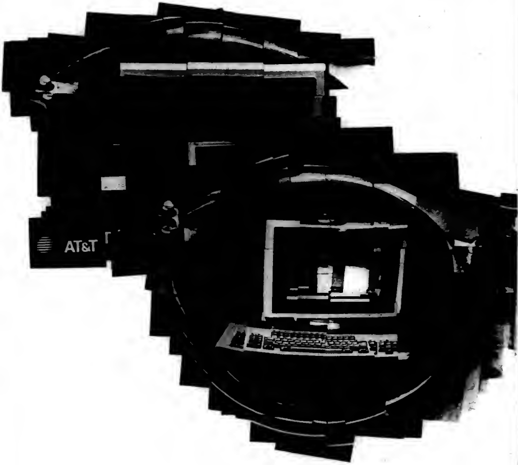
But WordPerfect's climb to the top was no overnight success story. For the past three years, user feedback has been applied to each new version of WordPerfect, pushing it closer and closer to perfection.

The result is WordPerfect 4.1, a word processor with unsurpassed business features for the IBM PC and compatibles. Features like an elegant thesaurus, a 115,000-word spelling dictionary, math capabilities, columns displayed side-by-side on screen, windows, line drawing, paragraph numbering, and extensive printer support.

Make your move.

There is a word processor that is as productive for executives as it is for secretaries. WordPerfect 4.1. It's the consummate corporate maneuver. For more information, call or write WordPerfect Corp., 288 West Center St., Orem, Utah 84057, (801) 227-4000.

WordPerfect
CORPORATION



TAKE A LONG HARD LOOK AT THE OT

Consider the AT&T 6500 Multifunction Communication System. For the first time, you have a real choice in 3270 Systems. From a company every bit as solid as Big Blue.

Which means, for a start, that complete 3270 compatibility in both SNA/SDLC and BSC protocols is a given.

A HOST OF HOSTS.

The AT&T 6500 will tie together data and applications from up to three synchronous and 16 asynchronous hosts. Not to mention allowing PCs to work as terminals.

What's more, you can switch back and forth between synchronous and asynchronous hosts with the touch of a single keystroke.

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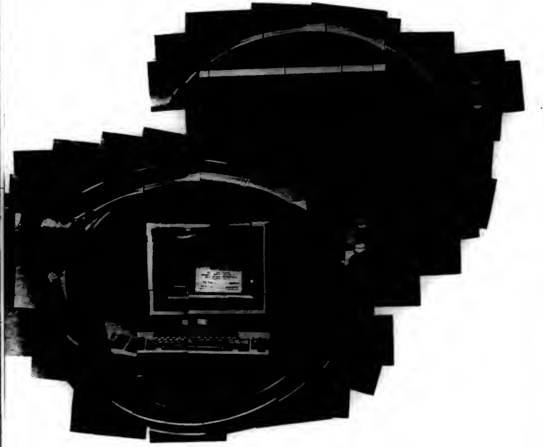
The 6500 lets you create up to four windows at the same time—into both synchronous and asynchronous hosts—and freely pass information among various databases.

For example, an inside salesperson taking an order could access: the customer's credit status in one host; relevant inventory information from another host at a completely different location; and the order form to fulfill the request from yet another host at another location.

All, on a single screen.

That kind of power means big productivity gains with no outlay for costly systems and applications development.



Product Spotlight/PC Word Processing Software

Vendor/Product	Minimum Memory Required (in bytes)	Menu Driven	Spelling Checker	On-Line Dictionary	Automatic Indexing	User-Definable Macros	Column Move	Outlining Capabilities	Mail-Merge Capability	Creates ASCII File	Price
Marc Software, Inc. 260 Sheridan Ave. Palo Alto, Calif. 94306 *Wordmarc Author*	256K	Yes	Yes	Yes	No	No	Yes	No	No	Yes	$195
Marc Software *Wordmarc Composer*	512K	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	$495
Mark of the Unicorn 222 Third St. Cambridge, Mass. 02142 *The Final Word*	192K	Yes	Yes	Yes	Yes	Yes	No	No	Optional	Yes	$395
Martin Marietta Data Systems P.O. Box 2392 Princeton, N.J. 08540 *Whitt*	256K	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	$500
Metasoft Corp. Suite 12 6809 W. Frye Road Chandler, Ariz. 85226 *Benchmark Word Processor*	256K	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	$199
Micro Architect, Inc. 6 Great Pines Ave. Burlington, Mass. 01803 *Word-X*	128K	Yes	No	No	No	No	No	No	Yes	No	$39
Micro Business Products, Inc. P.O. Box 530 Wayne, N.J. 07470 *Wordwriter 2*	256K	Yes	No	No	No	Yes	Yes	No	No	Yes	$199
Micropro International Corp. 33 San Pablo Ave. San Rafael, Calif. 94903 *Wordstar Professional 3.3*	192K	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	$495
Micropro International *Wordstar 2000, Release 2*	256K	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	$495
Microsoft Corp. P.O. Box 97017 16011 Northeast 36 Way Redmond, Wash. 98073 *Microsoft Word 3.0*	256K	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	$395
Multimate International Corp., an Ashton-Tate company 52 Oakland Ave. N. East Hartford, Conn. 06108 *Just Write*	128K	Yes	Yes	Yes	No	No	No	No	No	No	$145
Multimate International *Multimate Professional 33 Series Word Processor*	256K	Yes	Yes	Yes	No	Yes	No	No	Yes	Yes	$495
Multimate International *Multimate Advantage 360*	320K	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	$595
Multimate International *Multimate Executive Word Processor*	320K	Yes	Yes	Yes	No	Yes	No	No	Yes	Yes	$495
Office Solutions, Inc. 2802 Coho St. Madison, Wis. 53713 *Office Writer 4.0*	256K	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	$445
Owl Software Corp. Suite 210 15643 Sherman Way Van Nuys, Calif. 91406 *A-B-C*	192K	Yes	No	No	No	No	Yes	No	Yes	Yes	$240
Paladin Software Corp. Suite 7E 3255 Scott Blvd. Santa Clara, Calif. 95054 *Palword Plus*	192K	Yes	Yes	Yes	No	No	Yes	No	No	Yes	$149

Product Spotlight/PC Word Processing Software

Vendor/Product	Minimum Memory Required (in bytes)	Menu Driven	Spelling Checker	On-Line Dictionary	Automatic Indexing	User-Definable Macros	Column Move	Outlining Capabilities	Mail-Merge Capability	Creates ASCII File	Price
Palantir Software Suite 100 12777 Jones Road Houston, Texas 77070 *The Palantir Word Processor 3.0*	192K	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	$395
Paperback Software International, Inc. 2830 9th St. Berkeley, Calif. 94710 *Executive Writer*	128K	Yes	No	No	Yes	Yes	No	No	Yes	Yes	$69.95
Peachtree Software, Inc. 4355 International Blvd. Norcross, Ga. 30093 *Peachtext 5000*	128K	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	$295
Practicorp International, Inc. 44 Oak St. Newton Upper Falls, Mass. 02194 *Practiword*	256K	Yes	No	No	No	Yes	No	No	Yes	Yes	$99.95
Professional Software, Inc. 51 Freemont St. Needham, Mass. 02194 *Write'n Spell*	256K	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	$149
Quadratron Systems, Inc. Suite 1800 15260 Ventura Blvd. Sherman Oaks, Calif. 91403 *Q-One*	640K	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	$495
Quark, Inc. 2525 W. Evans Ave. Denver, Colo. 80219 *Word Juggler*	128K	No	Yes	Yes	No	No	No	No	Yes	Yes	$99
R Systems, Inc. 10310 Markinson Road Dallas, Texas 75238 *R Word*	256K	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	$295-$895
R Systems *R Office*	256K	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	$495-$1,295
Readiware Systems, Inc. P.O. Box 515 Portage, Mich. 49081 *Readiwriter*	256K	No	No	No	Yes	Yes	No	Yes	Yes	Yes	$395
Samna Corp. 2700 Northeast Expwy. Atlanta, Ga. 30345 *Samna Word I*	320K	No	No	No	No	No	Yes	No	No	Yes	$295
Samna *Samna Word III*	320K	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	$550
Samna *Samna+*	512K	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	$695
Schuchardt Software Systems, Inc. P.O. Box 13776 San Rafael, Calif. 94913 *Inteword*	128K	Yes	No	No	No	No	No	No	Yes	Yes	$195
Sof/Sys, Inc. 4306 Upton Ave. Minneapolis, Minn. 55410 *The Executive Secretary*	128K	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	$189.95
Softest, Inc. 555 Goffle Road Ridgewood, N.J. 07450 *Lex Word Processing*	256K	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	$500-$2,500
Software Publishing Corp. P.O. Box 7210 1901 Landings Drive Mountain View, Calif. 94039 *PFS:Write*	256K	Yes	Yes	Yes	No	No	No	No	Yes	Yes	$140

Product Spotlight/PC Word Processing Software

Vendor/Product	Minimum Memory Required (in bytes)	Menu Driven	Spelling Checker	On-Line Dictionary	Automatic Indexing	User-Definable Macros	Column Move	Outlining Capabilities	Mail-Merge Capability	Creates ASCII File	Price
Summa Technologies, Inc. 78885 S.W. Cirrus Beaverton, Ore. 97005 *Freestyle*	256K	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	$295
TCI Software Research, Inc. 1190-B Foster Road Las Cruces, N.M. 88001 *T³ Scientific Word Processing System*	512K	Yes	No	No	No	Yes	No	Yes	No	Yes	$595
TCS Software, Inc. Suite 600 6100 Hillcroft Ave. Houston, Texas 77081 *Q Word*	256K	Yes	No	No	No	No	No	No	Yes	Yes	$149
Texasoft, Inc. P.O. Box 1169 Cedar Hill, Texas 75104 *Versatext Word Processing*	128K	Yes	No	No	No	Yes	Yes	No	Yes	Yes	$99
Thorn EMI Computer Software, Inc. 3187-C Airway Ave. Costa Mesa, Calif. 92626 *Perfect Writer*	128K	Yes	Yes	No	Yes	No	No	Yes	Yes	Yes	$199
TNT Software, Inc. 34069 Hainesville Road Round Lake, Ill. 60073 *My Word*	128K	Yes	Optional	No	No	Yes	No	No	Yes	Yes	$35
United Software Industries, Inc. Suite 200 8399 Topanga Canyon Blvd. Canoga Park, Calif. 91304 *Einstein Writer*	128K	Yes	Yes	No	Yes	No	Yes	Yes	No	Yes	$149.95
Wang Laboratories, Inc. One Industrial Ave. Lowell, Mass. 01851 *Wang Word Processing for the IBM PC*	256K	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	$250
Wordperfect Corp. 329 N. State St. Orem, Utah 84057 *Wordperfect 4.1*	256K	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not available
Xyquest, Inc. 3 Loomis St. Bedford, Mass. 01730 *Xywrite II Plus*	192K	No	No	No	Yes	Yes	Yes	No	Yes	Yes	$295
Xyquest *Xywrite III*	256K	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	$395

Source code under lock and key

Placing software source code into escrow offers a form of protection for vulnerable users and vendors alike. A new wave of escrow firms is drawing up agreements that may withstand even the rigors of bankruptcy law.

By REGINALD WELLER and SHELLEY WALL

Consider the following scenario: You, an oscilloscope manufacturer, license an operating system from a start-up software firm and embed it in a controller in your product. A few months later, you discover that erratic output from an operating system call causes the oscilloscope to give inaccurate readings.

Since, according to the licensing agreement, the system's vendor is obligated to fix any bugs found, you quickly call the vendor's office — only to find it has gone out of business. If you cannot access the vendor's source code, your oscilloscope will be rendered unmarketable until replacement software is found and customized.

The above story, although fiction, is based in reality. When Art Benjamin Associates Ltd. went out of business in March 1982 [CW, April, 12, 1982], it left approximately 80 users of its Act/1 CICS programming aid without support or maintenance.

One solution that has emerged in response to users' fears that such a situation could happen to them is the escrowing of code with a neutral third party as escrow agent.

Software developers, in licensing a product to users, need to protect the proprietary source code they have written. While they wish to guard against unauthorized use, piracy and illegal copying, they also want to avoid legal disputes.

In contrast, users, as licensees, need to protect their software investments from discontinuance of product support and maintenance. Although a large, stable licensor is not likely to go out of business, a licensee could still suffer significant financial loss if the product line in question is discontinued as the result of a strategic business decision by the licensor. The prospect of time-consuming legal remedies exacerbates the licensee's vulnerability.

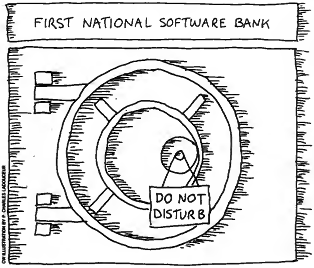
Protecting interests

Commonly, software licensing agreements give the licensee the right to use only the licensor's machine-readable object code. The licensor retains the human-readable source code in order to prevent misappropriation of proprietary materials.

The object code is, in effect, an encrypted version of the source code that needs regular updating and modification whenever the source code is revised. Since software programs are often released before they are fully debugged, licensees may need continued access after initial purchase. The escrow procedure provides the parties to a software licensing agreement with an opportunity to protect their respective interests safely and economically.

Setting up the procedure whereby source code is deposited into escrow can be simple and flexible. The escrow agreement should be separate from the underlying licensing agreement that controls the relationship between licensor and licensee.

Once the licensor and licensee agree that a software escrow is necessary

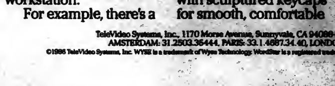


CW ILLUSTRATION BY P. CHARLES LADOUCEUR

Weller is the president of National Safe Depository of San Jose, Calif. Wall is an associate at the law firm of Fenwick, Davis & West in Palo Alto, Calif.

The TeleVideo 905 terminal. What a difference $10 makes.

TELEVIDEO 905 VS. WYSE WY-30		
FEATURES	TELEVIDEO 905	WYSE WY-30
Individual programmable function keys	16	4
Tilt and swivel standard	Yes	No
High contrast super dark Matsushita screen	Yes	No
WordStar* mode	Yes	No
Full-size keyboard	Yes	No



Let's face it; there are a lot of $399 terminals being sold these days. You get a basic box, a few tacked-on bells and whistles, and not a whole lot more.

But now there's the TeleVideo® 905. At $409, it has a feature set so powerful, your customers will think they're sitting at an expensive workstation.

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> **”**
>
> ***Although a large, stable licensor is not likely to go out of business, a licensee could still suffer significant financial loss if the product line in question is discontinued as the result of a strategic business decision by the licensor.***

and appropriate, they must negotiate the critical elements of the escrow agreement. Again, the interests of the licensor and licensee are likely to conflict. The licensor will want to release as little of the source code as possible and only under extreme circumstances, such as bankruptcy. The licensee, on the other hand, needs to ensure that all revisions and updates are included in the source code deposit and that access to the escrow materials is possible under all adverse circumstances: discontinuance of product support, acquisition of the licensor by another vendor, discontinuance of product line and other situations less extreme than bankruptcy.

Basic types. The most common type of escrow agreement is a three-party arrangement among the licensor, licensee and escrow agent. Also prevalent is the two-agreement arrangement: one between the licensor and the escrow agent for deposit of the materials and the other between the licensee and the escrow agent for release.

Another type is a two-party agreement between the licensor and escrow agent for the benefit of multiple users, or licensees of record. This format avoids the expense and burden of establishing repeated escrows that are identical in nature. Additions or deletions to the list of the licensees are submitted by the licensor. Written confirmation from the escrow agent provides an accurate record of potential recipients of the escrowed materials.

Trust agreements are a new development in escrows. Such agreements are designed to help shield the escrow from a trustee in bankruptcy by removing title to the source code from the licensor's estate. The escrow agent, as trustee, holds title in trust for the benefit of the licensee, who holds beneficial or equitable title.

Escrow materials. The materials deposited into escrow must be sufficient to enable the licensee to maintain and enhance the program independently. Besides source code, support documentation should include such items as type of hardware used, the programming language, printouts, flow charts, schematics and even machine-readable object code. Any escrow agreement must carefully specify all material to be deposited to ensure that the purpose of the escrow is not undermined.

Updates. A commoo characteristic of most software is the ongoing need to debug, update, enhance or modify. These periodic revisions must be added to the escrow and then acknowledged in writing to all parties by the escrow agent to create a written record during the life of the software. As with the original deposit, the update process must be clearly drafted into the escrow agreement.

Verification. Licensees commonly ask how they can be certain that the licensor has indeed deposited into escrow the authentic and complete material required by the agreement. One effective method is to have a third-party verifier. However, such a procedure can be expensive and cumbersome, since to do anything more than spot-check a complicated and lengthy source code often proves time-consuming. With frequent updates, the difficulty increases.

One less problematic alternative has the licensee run the deposited source code (or other escrow materials) with the applications it is intended for, with proper witnesses, before approving the deposit of the materials into escrow.

Another method for achieving compliance is to draft language into the agreement whereby the licensor warrants that all materials deposited or to be deposited conform with the agreement. Since normal contract remedies may be insufficient, compliance by the licensor may be further encouraged by use of liquidated damages.

Finally, the escrow agent, in addition to the written acknowledgement procedures, can play an active role — carefully prescribed in the agreement — of inspecting materials received for deposit.

Access. Control of access to the escrow documentation is another important provision of the escrow agreement. Ideally, storage will be in a safe deposit box in a climate-controlled vault, whereby all access can be positively identified and recorded. Each escrow should be stored in its own individual box. Licensees usually will be required to give written advance notice for access so that the licensor, at its option, may be present.

Release procedures and conditions

Time is truly of the essence when a licensee finds his investment in a software program jeopardized by the licensor's failure to maintain the program, whatever the cause. Extended delays must be avoided.

Normally, the licensee will serve written notice to the escrow agent, with a copy to licensor, that a default condition has occurred sufficient to trigger a release of the escrowed software under the agreement. The escrow agent must then, in turn, notify the licensor within the time period specified in the agreement. If the licensor does not respond within a specified number of days, the escrow agent may release the source code, or a copy thereof, to the licensee.

Precise and detailed contractual provisions for the release of source code and documentation to the licensee are critical to an effective escrow. The provisions mainly concern the economic viability of the licensor, especially the likelihood of bankruptcy, and the licensor's maintenance obligations as defined in the licensing and escrow agreements

The escrow agreement should be structured to provide for release of the escrow materials in the event a licensor's failing economic condition jeopardizes its performance under the license agreement. Such circumstances commonly include ceasing to do routine business, discontinuing the software product at issue and bankruptcy.

Lack of maintenance by the licensor has many possible causes. A program can be discontinued for business reasons or as a result of a merger or buy-out. Key technical personnel can leave the company. Documentation can be lost, with no backup available. Financial problems, often minor at first and more pervasive later, can result in cutbacks that jeopardize the ongoing maintenance and enhancement process. Any or all of these circumstances would trigger the licensee's urgent need to have access to the source code in order to support the licensed program independently.

When the licensor disputes a licensee's claim of default, the dispute resolution provisions of the escrow agreement are activated. Improperly drafted dispute procedures can defeat the very purpose of the escrow. Some possible solutions to expedite release of escrowed source code in the event of a dispute include the following:

Injunction. If the licensor unjustifiably refuses to allow release of the escrow materials, licensees may obtain a temporary restraining order to prevent the licensor from acting to prevent release.

To increase their chances for success in having the court grant a preliminary injunction, licensees should see that appropriate language is drafted in the escrow agreement.

Arbitration. An arbitration clause is frequently used in software escrows. This provision specifies that the parties have to present their respective cases before a predetermined arbitrator within a few days and confine the arbitration to the very narrow issue of whether a default has, in fact, occurred. The arbitrator would be required to render his opinion within a similarly short time frame.

Liquidated damages. This technique, common to real estate transactions, serves primarily to discourage the licensor from improperly objecting to release of the code.

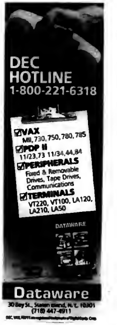
The cost of a software escrow is a negotiable matter. Either party may pay, or the fees may be shared. Multiple-user escrow expenses are borne by the licensor, often as a value-added marketing benefit for the licensees. Costs for the release of materials are typically paid by the licensee requesting the release.

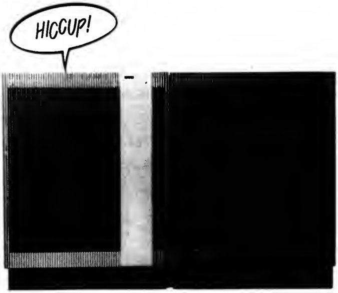
Legal issues

Although the scope of the legal issues raised by the escrow procedure is considerable and cannot be treated fully here, it is important to acknowledge the potential impact of bankruptcy law in particular on the effectiveness of the escrow release provisions.

Whether or not an escrow will succeed in its essential purpose if the licensor bankrupts depends on all parties resolving the following issues:

- Is the software escrow an executory contract that can be rejected by the




HICCUP!

trustee in bankruptcy?

- Do the escrow materials constitute property of the bankrupt's estate?
- Will the automatic stay procedure prevent the escrow agent from delivering the escrow materials to the licensee?

Although bankruptcy law could have an adverse impact on the effectiveness of an escrow, numerous commentators have suggested viable remedies that, while not eliminating the risk, serve to reduce it as much as possible under the law. When drafting an escrow agreement, legal counsel should be sought to ensure that the document provides maximum protection for both parties.

Role of the escrow agent

Traditionally, banks, accounting firms and lawyers undertook escrows. But, as the sophistication and complexities involved have increased, companies specializing in software escrows have emerged. An escrow firm must be knowledgeable in the legal and technical details required to furnish clear, flexible guidelines throughout the life of the software program.

> ***The 'liquidated damages' clause, common to real estate transactions, discourages the licensor from improperly objecting to release of the code.***

The duties of an escrow agent can be divided into two general categories: administration and physical protection.

Administration. An experienced escrow agent handles many escrows comprising a wide variety of needs and problems. The agent works closely with attorneys and is aware of the latest trends, techniques and legal developments. The agent's role can be as active or passive as the parties to the escrow feel is necessary.

Legal assistance is always necessary before executing an escrow agreement. Nevertheless, the escrow agent should be well qualified to suggest an escrow format that will meet the needs of the particular case.

Once the escrow framework has been established, ongoing administrative expertise is essential. The escrow materials must be deposited and acknowledged in writing to all parties.

Other administrative services that can be performed by the escrow agent include the following:

- Notification of opening of escrow. This establishes for all parties the actual completion of the escrow agreement and its commencement date, that is, the date of the original deposit.
- Acknowledgement process. Every receipt of material for an escrow should be acknowledged in writing, usually to all parties. Each item in the update or modification must be identified specifically in order to create an audit trail over the life of the escrow.
- Follow-up. Many of the events in the escrow process need to be tracked over time to make sure that every required procedure is performed when required. Computerized records management systems are an excellent means for an escrow agent to provide effective, ongoing administration and follow-up.
- Verification. As discussed earlier, the escrow agent can, at a minimum, examine the materials deposited to determine conformity to the agreement provisions. Depending upon the degree of verification desired by the parties and upon the technical complexity involved, the agent can act as, or arrange for, an outside expert in the verification process.
- Intermediary. Most escrows provide a mechanism for settling disputes, usually by means of the courts or arbitration. The escrow agent can also serve as an intermediary, but his role should be clearly defined in advance, preferably in the escrow agreement itself.
- Termination. The termination of an escrow must be carefully executed in writing by the escrow agent. The escrow agent must also return all materials to the proper party.

Physical protection. The other principal function of an escrow agent is to physically protect and preserve the material deposited in escrow.

Storage ideally should be in a vault or custom-built vital-records room designed to protect computer media over long periods of time. Climate control and fire protection are normal features of such depositories.

To preserve the integrity of each escrow, the documentation should be stored in individual safe deposit boxes or containers. Escrow materials should not be commingled, both to prevent errors and to provide accurate transaction records.

The escrow agent should be able to maintain absolute control of access to the storage area so that permanent logs of every access can be created. Authorization for any access should be in writing in advance.

Escrow agreements can provide a viable, effective means for satisfying the sometimes conflicting needs of the parties to a software licensing agreement. Although, as noted, the reliability of the escrow procedure in the event of bankruptcy is uncertain, escrow agreements still provide the parties to a software license agreement with a measure of protection that is difficult to achieve by any other means. ■

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To illustrate the variety, adaptability and versatility of AT&T ACCUNET Digital Services, we've compiled this set of typical questions from managers faced with complex business needs.

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A: AT&T's approach to Electronic Order Exchange can help you do just that. With an on-line, intercompany network for order processing among suppliers, manufacturers, distributors, sales agents and retailers. Purchase orders, inventory availability and other messages can be transmitted directly between companies. So inventory levels and order-processing time can be reduced.

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For low- to medium-volume users with geographically dispersed locations that don't warrant a strictly dedicated network like DATAPHONE Digital Service, ACCUNET Packet Service is an economical choice. Software-controlled, this public switched packet data network supports digital quality, high-capacity dedicated access for short bursty information at speeds of 4.8, 9.6 and 56 kilobits per second (kbps).

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ACCUNET Packet Service is available via 99 access points in the U.S., with international access to Canada, the U.K., France, Italy and Japan, with additional countries planned for 1986.

2. Q: I have a critical need to transmit large amounts of data, but not enough to cost-justify a dedicated private network. What service would work best for my company?

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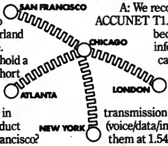
DATAPHONE Digital Service is especially appropriate for data transfer applications requiring the highest accuracy, efficiency and reliability. Providing digital data transfer rates of 2.4, 4.8, 9.6 and 56 kbps, virtually error free, within flexible, dedicated networks. In configurations

that can be tailored to meet your company's specific communications needs.

Our DATAPHONE Digital Service is available in most major metro areas in the U.S., with international access to Canada and the U.K. Plus access to France and Switzerland at the 56 kbps rate.



4. Q: How can I hold a meeting, on short notice, with my sales team in Chicago, my buyer in Miami and my product manager in San Francisco?

A: With AT&T video and audiographic teleconferencing, you can 'fit' the whole country (plus many European countries) into one room for effective decision-making.

Using telecommunications channels for fully interactive video and audio, audiographic, or one-way video, two-way audio teleconferences, you can increase the productivity of your key executives—and monitor travel expenses.

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ACCUNET Reserved 1.5 Service offers the broadest range of features, with full-motion color video; plus audio, facsimile and graphics support.

ACCUNET Reserved 1.5 Service is available on a part-time basis in over 40 major metro locations in the U.S., with video teleconferencing access to Canada, the U.K., Italy, France, Sweden, Switzerland and West Germany. Including data transmission to France and the U.K.

5. Q: I work for a large corporation with many regional and remote branch offices that must tie their data transmission systems back to central processing sites.

And I need a digital service that can integrate all of these systems together for high-capacity transmissions between my larger locations.

A: We recommend ACCUNET T1.5 Service because of its large information-carrying capacity.

ACCUNET T1.5 Service can integrate multiple transmission requirements (voice/data/image) and transmit them at 1.544 megabits per second (mbps) between your main office locations and remote sites.

ACCUNET T1.5 Service can also work in conjunction with ACCUNET Reserved 1.5 Service and AT&T SKYNET® Digital Service to expand geographic coverage.

ACCUNET T1.5 Service is now available in many parts of the U.S., with international connection to Canada.

And should you need to integrate a large number of communications requirements—data, graphics, voice, we also offer the all fiber-optic AT&T ACCUNET® T45 Service, the equivalent of twenty-eight 1.544 mbps channels.

6. Q: I have a problem with timely communications between my engineering department in California and my manufacturing department in New Jersey. It's causing delivery time delays, production lags and reduced productivity.

A: What you need is a communications network linking design, engineering and manufacturing functions. By doing this, you can integrate functional technologies such as computer-aided design, engineering and manufacturing (CAD/CAE/CAM).

This is a critical first step toward computer-integrated manufacturing, which will help you streamline information flow, reduce design, manufacturing and distribution intervals and improve the quality of both design and the finished product.

So you can model manufacturing functions and work out potential problems—before incurring actual plant or material costs.

Again, AT&T ACCUNET Digital Services make it possible. With (depending on your specific business needs) ACCUNET Switched 56 Service, ACCUNET T1.5 Service, DATAPHONE Digital Service or ACCUNET Reserved 1.5 Service.

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There's a lot more we could say about the TeleCAT-286. But it's an even better idea to get your hands on it. So call 1 (800) TELECAT, Dept. 133, and we'll tell you where you can try one.

The TeleCAT-286. Our 20MB version is $2995; 30MB, $3495. For high performance at a low price, don't settle for less.

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In Depth

Revival of the fittest: New vigor for your development life cycle

Too many DP shops, taken with the wonders of 4GLs and code generators, let their systems development life cycle methodologies fall into disuse and disrepair. Best bet: Don't let rust set in to begin with.

By MARK DUNCAN

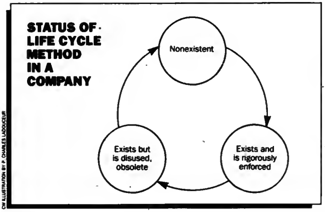
Some say the last thing the DP world needs is more talk about the systems development life cycle. A number of noticeable trends are beginning to make this remark ring true.

First, the tidal wave of commotion caused by the "instant productivity" of fourth-generation languages and program code generators makes a systems development life cycle methodology appear almost archaic.

Second, a glut of inexpensive, vendor-supplied packaged software, versatile enough to balance multicorporate financial statements as easily as domestic checking accounts, has given users a practical alternative to in-house applications development.

Finally, despite the young age of the DP industry, it would seem that we have experienced enough to obviate repetitive talk about "how best to do things." And yet the systems development life cycle is constantly topical. There seems to be no limit to the extent to which this methodology can be refined, embellished, modified, rewritten and even automated.

Duncan is a systems analyst in the quality assurance section of a major Dallas bank.


STATUS OF LIFE CYCLE METHOD IN A COMPANY

Nonexistent
Exists and is rigorously enforced
Exists but is disused, obsolete

CW ILLUSTRATION BY P. CHARLES LADOUCEUR

It would be easy to conclude that all the attention paid to systems development life cycles occurs because they are inherently flawed, generate too many exceptions to the rules and, in a technological environment that changes daily, become more cumbersome than practical. But the cause is often a much more fundamental affliction — having insufficient means for supporting a systems development life cycle to keep it alive and kicking.

In the initial enthusiasm that generally accompanies the implementation of a new development life cycle methodology, an effective means for its continued support is easily overlooked, resulting in the premature death of the methodology. Before discussing how this may be prevented, two observations must be made concerning the systems development life cycle's definition and disposition.

Definition and status

The "IEEE Standard Glossary of Software Engineering Terminology" provides a practical definition for the software life cycle:

"The software life cycle is that period of time that starts when a software product is conceived and ends when the product is no longer available for use. The software life cycle typically includes a requirements phase, design phase, implementation phase, test phase, installation and checkout phase, operation and maintenance phase and, sometimes, retirement phase."

While this definition may not exactly represent all systems development life cycles, a logical, phased approach is a characteristic common to most systems development methodologies. Though the number of phases and phase names may vary, the constituent activities are generally constant.

Broadly speaking, the status of the systems development life cycle in most DP departments falls into three categories: In Category 1, the development life cycle is nonexistent; in Category 2, the life cycle exists and is rigorously enforced; and In Category 3, the life cycle exists, but it is not used or obsolete.

There are, of course, other situations — for example, one in which a life cycle method exists but is enforced

A disused or obsolete systems development life cycle: Symptoms, causes and remedies

Symptom	Cause	Remedy
Staff unaware of existence of systems development life cycle	No publicity; buried among other standards or fragmented, unstructured with no identity	Publicize on a regular basis; ensure it is a formal, cohesive, identifiable set of procedures within overall standards
Staff aware of it but cannot get to it easily or thinks it is not meant for them	Degree of accessibility is low	Distribute generously — at least one per office or project; centralize with easy but well-controlled access; consider on-line option for critical parts
Staff does not know how to use it or has difficulty interpreting it	No training provided to new and existing staff and users	Provide rigorous and frequent training; quantify training into departmental policy; do not overlook needs of non-DP staff such as end users, audit personnel
Violations, adherence go unnoticed	No means for identifying violations or verifying adherence	Institute product reviews, one outcome of which will be documented adherence and violation
Becomes out of date, inappropriate, hence falls into disuse	No vehicle exists for updating it to keep up with technology, procedures and so on	Identify failures, weaknesses as well as alternative procedures — another outcome of a product review
Applied conscientiously, but product quality is still poor	No means for verifying it works, that is, produces quality applications	Record errors, produce statistics to show trends; relate error trends back; make recommendations to improve
Staff treats adherence very lightly, knowing consequences of not following will be harmless; nobody wants ownership	No visible management support	Best remedy is for management to provide adequate time and means for activity; foster joint ownership, since poor-quality applications reflect adversely at all levels

only weakly — but these are usually transient states falling either between categories 1 and 2 or 2 and 3. So the implication is that although the categories appear to be discrete, they may in reality represent a progression of events.

Consider this scenario: An organization recognizes the need for a systems development life cycle (Category 1) and acquires one. The promise of potential benefits, coupled with the novelty of applying a new methodology, give strength and stability to the development life cycle (Category 2). But various factors — rapid organizational growth or decay, increased work load, staff turnover, mandated deadlines — weaken this strength and stability. The development life cycle falls victim first to abuse, then to disuse and, almost unnoticed, assumes a Category 3 disposition.

Preventive measures

A systems development life cycle with any of these dispositions creates a problem, or at least a potential problem, if no means exist for supporting it. A Category 1 situation is easy to deal with: If an organization has diagnosed the lack of a formal systems development life cycle, it will undoubtedly go one logical step further and remedy this situation. Options that immediately come to mind include writing it in-house, using consultants to write a tailored methodology or selecting a vendor-supplied methodology with modifications.

With a Category 2 situation, if a systems development life cycle exists and is accompanied by a means for actively enforcing it, it is not unreasonable for an organization to leave well enough alone. But leaving well enough alone can sometimes be as harmful as overconsideration.

Nevertheless, in both categories 1 and 2, it is not too late to develop preventive measures to avoid a transition to Category 3. Once a development life cycle assumes a Category 3 disposition, significantly more effort will be required to revive and restore it and to develop a procedure for maintaining it, so that it does not once again fall into disuse.

> **99**
>
> ***The software life cycle is the period of time that starts when a software product is conceived and ends when the product is no longer available for use.***

The best way of developing preventive measures for a certain situation is to identify and examine the causes that led to it. A systems development life cycle methodology can fall into disuse for the following reasons:

- It is not publicized and has no identity.
- It has a low degree of accessibility
- No training in its use is provided for new and existing systems development staff and users.
- No means exist for verifying adherence to it or identifying violations against it.
- No vehicle exists for updating it to keep pace with technology, procedures, changing user expectations and so on.
- No means exist for ensuring that it still works.
- There is no visible management support.

The systems development life cycle is not publicized and has no identity. The failure to publicize and give identity to a systems development life cycle is a fundamental failing of systems development management. To a certain degree, DP staff members are expected to possess enough initiative to ascertain what standards exist in an organization and to what extent they are enforced. But the onus is still on the organization to make explicit its methods and procedures.

Newly recruited programmers will probably continue to do things as they have been doing most recently unless told otherwise. Ultimately this could necessitate reworking to bring applications into line with company standards. It could also affect the performance evaluation of that programmer if adherence to development life cycle standards is a contributing factor to the evaluation.

A systems development life cycle will not be the only standard methodology active within a DP department. There will be administrative standards concerned with project control; operational standards governing computer resource usage; personnel standards related to professional conduct, dress code, punctuality and so on; and other technical standards that will affect DP staff daily.

Therefore, it is important that the development life cycle methodology does not get buried or lose its significance among all the other standard procedures. While it is essential that the methodology gain acceptance as an integral part of overall departmental standards, it is equally important that it retain its own identity within those standards.

The systems development life cycle has a low degree of accessibility. Having taken the trouble to identify and advertise the methodology, it makes sense to ensure it is easily accessible. DP workers are an adventurous breed by nature. Given the choice of referring to a manual to enable them to "do it right the first time" or making a few educated guesses, they will invariably opt for the latter. They have learned that people and computers are tolerant and forgiving in dealing with experimentation, while referring to a manual might be tantamount to losing face in the eyes of peers.

So everything possible must be done to put required information at the fingertips of those who need it. Systems development methodology documentation must enjoy generous distribution to all relevant staff. If there are limitations on this distribution, then access should be centralized with an efficient checkout system so that valuable time is spent not looking for the rules but applying them.

The documentation must also be current and accurate. Nothing will thwart the desire to do it according to the rules more than finding that the rules are out-of-date or that they simply do not work. Consideration should be given to implementing a systems development methodology that has partial or total on-line accessibility, especially when it governs critical development activities or when its application is universal within the company.

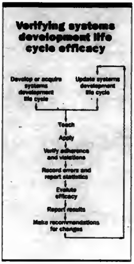
An on-line option will also facilitate updating the methodology. Changes can be disseminated instantly to all affected staff, and paperwork will inevitably be reduced.

No systems development life cycle methodology training is provided to new and existing systems development staff and users. Advertising a systems development life cycle methodology and making it easily accessible are insufficient measures to guarantee knowledge of the methodology. DP staff members, left to their own devices, quite naturally will take the easiest or shortest route to their destinations. This is not to say that they will deliberately develop an inferior product. On the contrary, given the time and means to do a good job, very few would abuse the opportunity.

However, shortest routes will differ from one person to another. This inconsistency is undesirable, if not unacceptable, in an environment in which effective system maintenance relies on uniform product quality. Doing a good job, therefore, entails more than simply getting the right answer. It means getting the right answer by applying the appropriate development life cycle methodology standards. This can only be done if those standards are known.

Training in the systems development life cycle methodology requires consideration at three levels.

The first and obvious level is for new DP employees. If they are complete novices, they will require more prolonged and intensive instruction than if they have come with experience from another company. In the latter case, they will in all likelihood be familiar with some form of systems development methodology and will probably only need to learn the new company's equivalent of what was practiced in the old.


Verifying systems development life cycle efficacy
Develop or acquire systems development life cycle
Update systems development life cycle
Teach
Apply
Verify adherence and violations
Record errors and report statistics
Evaluate efficacy
Report results
Make recommendations for changes

The second level of training is directed at mature staff. "Mature" in this case refers to DP staff members who have been with the organization long enough to be familiar with the systems development methodology through first-hand use but require further training for one or more of the following reasons:

- The last time they used the systems development methodology was some time ago, and a refresher course is necessary before beginning another project.
- The work they have undertaken so far has only taught them a part of the methodology, and they now need to extend their knowledge.
- They have been assigned to train programmers or other DP staff and therefore require thorough familiarity with the methodology.

Because of these varied training requirements, it would help if the systems development methodology training materials were modular in structure. This not only will facilitate extensive training during which the whole methodology is presented but will also allow a particular module to be taken out of context and presented in isolation for a specific purpose.

Finally, the third level of training is directed at end users and the non-DP staff who play key roles in the life cycle of a project. It is more important that these employees understand the process by which an application is developed rather than be taught the inner workings of a computer.

Coping with change

The impact of frequent change in end-user requirements must be demonstrated in dollars and cents, and the philosophy that "It is cheaper to fix it now than fix it later" must become second nature to them.

Training tends to be regarded as an isolated, one-time process with a definite beginning and conclusion. In some cases this is true, but systems development methodology training must be continual and open to change in order to cope with the improvements and technological advances within DP.

A good way to ensure that staff will be made aware of the changes automatically is to have a training program that is active throughout the year that all are obliged to take advantage of. An even better method would be stating the changes in a "departmental training policy."

To give an example: New employees will undergo 40 hours of systems development and other standards training in their first year. All other appropriate DP staff will receive 20 hours of training on an annual basis. These figures are only 2% and 1%, respectively, of a 50-week year. Quantifying development life cycle training in this way facilitates incorporating it into an individual's annual schedule and further emphasizes that the methodology is there to be learned and then applied.

No means exist for verifying systems development life cycle adherence or identifying violations. It would be ideal to develop a systems development methodology, teach it to the DP staff, tell them they have to apply it and then sit back and assume that is the end of it. Reality presents a somewhat different picture. Again, it is not that people willfully violate a standard procedure.

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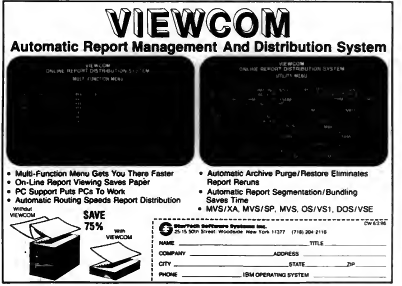
> ***While it is essential that the systems development methodology gain acceptance as an integral part of overall departmental standards, it is equally important that it retain its own identity within those standards.***

Rather, attitudes, performances under pressure, skill levels and interpretive abilities simply differ from one person to another.

True, the purpose of the systems development life cycle, or of any standard in general, is to smooth out these variations, yielding uniformity in product quality. But this process is not instantaneous. The methodology must be applied, the results must be evaluated, and then the methodology must be modified to eliminate any weaknesses, ambiguities and so on.

Thus, product reviews need to be incorporated into the development life cycle at appropriate points. These review outcomes are crucial in preventing the systems development methodology from taking on a Category 3 disposition. In this instance, a



> ***The purpose of verifying the efficacy of a systems development life cycle methodology goes beyond merely establishing that it works. The act of repeatedly reviewing the same methodology keeps one alert to alternative, and possibly better, ways of developing systems. Just because a particular method works does not mean it cannot be improved.***

review will provide a means for verifying development life cycle adherence and identifying violations, after which appropriate action may be taken.

It may appear unnecessary to verify adherenre to the systems development life cycle explicitly, for if there are no standards violations, then the implication is obvious. But there is a potential benefit associated with verification: The outcome of a review should be balanced and objective, certainly identifying violations when present but commending with equal weight instances of development life cycle adherence. If this is known by the product developer beforehand, it will preclude feelings of defensiveness and hostility during the review.

If the sole purpose of a review was to bring to light a subject's weaknesses or faults, then the review is apt to generate more of a negative atmosphere than a positive one. It might even create a sense of inferiority in a person where it should not legitimately exist.

No vehicle exists for updating a systems development life cycle methodology to keep pace with technology, procedures, changing user expectations and so on. A systems development life cycle may fall into disuse very easily because it has become outdated, cumbersome or inappropriate. This results from not having a formal vehicle for updating the methodology with changes necessary for survival.

When a systems development methodology is found to be lacking or inapplicable for some reason — for example, a technological or environmental change or a change in end-user expectations — most enterprising programmers and analysts will find a way around the problem. They only have the timely completion of their task in mind.

However, two things need to be done in this situation. First, the deficiency or inapplicable procedure within the systems development life cycle needs to be documented. Second, the means, if any, by which the problem was circumvented needs to be recorded, for this could potentially be part or all of the recommendation to update the methodology.

The documenting of a problem within the systems development life cycle and the alternative procedure that was used in its place is another result of a product review.

Following that, the information should be passed on to the personnel responsible for investigating the cause of the systems development failure or incorrectness and formulating recommendations to resolve the problem.

No means exist for ensuring that a systems development life cycle methodology works. This is not strictly a condition that would cause a development methodology to assume a Category 3 status, for a methodology may be diligently applied and still not yield good results. What is required here is proof that a particular systems development methodology is as effective as it can be in terms of the quality of the applications that have used it.

Therefore, records need to be kept of the errors generated by these applications. The errors will need to be examined statistically for frequency and type. If trends are revealed, they should be a clue to which part of the development life cycle caused the errors.

The methodology is then modified to reduce the likelihood of the errors recurring, and another phase of recording and statistical reporting begins (see chart page 81).

The recording of errors produced by the application and the monitoring of error trends should be part of the testing phase of the systems development methodology and must also be continued for a mandatory period of time following system implementation — say, three to six months.

Care must be taken to attribute to the methodology only those errors that are genuinely the fault of a poor methodology, and not, for example, the fault of fluctuation in error trends that have been caused by hardware failure or inadequate operational procedures.

The purpose of verifying the efficacy of a systems development life cycle methodology goes beyond merely establishing that it works. The act of repeatedly reviewing the same methodology keeps one alert to alternative, and possibly better, ways of developing systems. Just because a particular method works does not mean it cannot be improved.

There is no visible management support of systems development life cycle. There is no fail-safe way to enforce a systems development methodology. The best methodology in the world will not necessarily

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> ***The essential purpose of any tool is to enable accomplishment of a task with greater ease than could be done without that tool. Furthermore, for a tool to be effective, it must be used correctly and kept in working order. A systems development methodology is nothing more than a tool for the developers of application systems.***

encourage or guarantee its application. Ultimately, it is the front-line programmers and analysts who will or will not apply the systems development methodology, and other than putting a gun to the head or promising a reward, what alternative is there to ensure the methodology is followed?

The answer has already been stated once: Given adequate time and means to do a good job, most people will do so without the need for additional coercion. And adequate time and means is probably the best form of management support that can be given. Its absence may easily be interpreted by DP staff as a clear signal that adhering to the systems development methodology is as of much — or little — consequence as not adhering to it.

Rather, the attitude should be one of shared concern. Management should endeavor to provide adequate time and means. They must remember that even though it is possible to pinpoint the culprits of systems development methodology violations, the repercussions of a low-quality product will be felt at their level as well.

Similarly, DP staff should be sympathetic to the fact that management is generally governed by deadlines and dollars. Therefore, the staff should endeavor to provide realistic resource estimates for applying the systems development methodology. Should there be limitations placed on them, then it is equally important that they apprise management of the consequences of not being able to follow the methodology.

A simple tool

The essential purpose of any tool is to enable accomplishment of a task with greater ease than could be done without that tool. Furthermore, for a tool to be effective, it must be used correctly and kept in perfect working order.

A systems development life cycle methodology is nothing more than a tool for the developers of application systems. It must be applied correctly and scrutinized regularly to ensure it is still capable of its intended purpose. If end results or operating environments change, then the tool must be changed accordingly, remembering that minor modifications, although frequent, are preferable to major modifications of any frequency.

In the context of data processing, there will always be a need for formal systems development life cycle methodologies. Certainly they are better suited to large business and scientific applications, which demand massive investments of time, money and human resources. But even small applications, if developed on a frequent basis, cannot ignore the safety of development via a repetitive and systematic process.

A systems-development life cycle does not have to be a prolonged, multiphase methodology. It can be as simple as a three-, four- or five-step process, as long as the steps retain the same sequence and dependencies from one application to another.

Neither fourth-generation languages — or fifth-generation ones, for that matter — nor the most sophisticated packaged software will make systems development life cycles redundant. There will always be a measurable distance in the path from concept to processed data. The simple but important point to remember is that a systems development life cycle is successful only if it works and keeps on working. ■

NEW PRODUCTS

System offers conversion of type, image

Datacopy Corp. of Mountain View, Calif., has announced the Datacopy Jetreader and Jetreader Plus scanning system, said to provide optical character recognition (OCR) and image processing capabilities.

The scanning system converts stacks of hard-copy data to disk files formatted for standard word processing software or to images for use in documents or data bases.

According to a company spokesman, the Jetreader image scanner offers selectable resolutions of 200 dot/in. or 300 dot/in. and an automatic paper feed. Scan times are approximately 43 seconds at 300 dot/in. and 28 seconds at 200 dot/in.

The Jetreader comes with an interface to the IBM Personal Computer family and Datacopy's recently introduced OCR or OCR Plus software, along with its Word Image Processing System (WIPS). It accepts a stack of up to 10 sheets of legal-size or smaller paper, the vendor said.

WIPS provides image scanner control, image manipulation, file management, image display and hard-copy output. It also allows integration of images into documents prepared on standard word processing software for display or printing. It costs $695.

The OCR software is pretrained to read 12 standard office type styles and convert them into computer code for modification on word processing software. In addition to the standard type styles, the OCR Plus package can be trained by the user, using pattern technology, to recognize virtually any 10- or 12-pitch monospace type style.

The OCR software runs on any IBM Personal Computer or compatible and operates with Datacopy's Model 700 and 730 platen scanners and its other document scanners. OCR and OCR Plus are priced at $695 and $995, respectively.

Jetreader, including OCR software, sells for $2,950. Jetreader Plus, including OCR Plus software, costs $3,250.

Lee Data unveils terminal

Viewed as replacement for interactive IBM 3178 model

The Phaze Terminal Division of Lee Data Corp. in Minneapolis has announced the Model 1178 display, a plug-compatible replacement for the IBM 3178 interactive terminal.

According to the vendor, the Model 1178 has a 14-in. screen and operates with all models of IBM controllers for large-scale computer connectivity.

The compact terminal is said to be suited for interactive inquiry, data retrieval, record modification and program development tasks.

Footprint, display

The footprint of the Model 1178 measures 10½ by 11 in., and the display is said to weigh 23 pounds.

The ergonomic design features a tilt-and-swivel monitor, a detached, low-profile keyboard in four layout styles and an optional amber screen. It also features a key lock for added security, a company spokesman stated.

The Model 1178 is priced at $995 on a single-unit basis and $796 in quantities of 100. Larger quantity discounts are also available.

Other products of the Phaze Terminal Division of Lee Data include the P3278 monochrome terminal and the P3279 color terminal.

Lee Data Corp. Model 1178 display

Secure net debuts for micro users

The Federal Systems Division of Grid Systems Corp. of Vienna, Va., has introduced a Distributed Secure Information Network (DSIN) for laptop micro users. The network was designed to meet military and intelligence agency requirements for mobile and secure micro communications. The network also will be available for commercial sales.

The DSIN allows local or remote users to communicate with one another via fiber-optic cables, phone lines or satellite links using a recently released software package called Gridmail, a company spokesman said.

According to the spokesman, Gridmail ties all of the users and computers together. It permits the mobile users to continue to communicate even though they are continuously on the move.

DSIN will allow mobile users to communicate to other temporary or fixed locations and will allow users to be assured that all data is securely and correctly received, the vendor said. All of the products were designed to meet the Tempest security standard of the U.S. Department of Defense to prevent leaks of sensitive data.

The Tempest Gridcase (Model 1307), an extension of the Grid line of IBM-compatible laptops, will cost $11,250. The Gridserver (Model 1727) will sell for $24,695.

All of the products will be available in late summer, the vendor said.

INSIDE

Speech transcriber announced

Features 1,000-word vocabulary recognition

At the recent Speechtech '86 speech technology conference, Dragoo Systems, Inc. of Newton, Mass., announced Voicescribe-1000, an automatic dictation transcription system.

Voicescribe-1000 has a 1,000-word active vocabulary speech recognition capability. According to the vendor, it runs near real time on a personal computer with an 8-MHz Intel Corp. 80286 processor.

Although intended as a large-vocabulary artificial language recognition system, Voicescribe-1000 is also said to be capable of limited natural language recognition tasks.

Voicescribe-1000 can be used for dictation of informal notes and documents with a limited vocabulary or repeated phrases.

Reportedly, the vocabulary is easy to customize, so the transcription system can be used for applications in which many letters are written on the same subject, such as sales letters.

Voicescribe-1000 is priced at $995. It includes an IBM Personal Computer XT- or AT-compatible peripheral board, the Voicescribe-1000 recognition software, user documentation and the Dragonkey voice-activated keyboard utility software.

The minimum system configuration is any IBM PC or compatible with 256K bytes of random-access memory (RAM) and a hard disk. To use the full 1,000-word vocabulary capacity, the user must have a personal computer with an 8-MHz 80286 processor and 640K bytes of RAM, the vendor said.

Graphics library allows Turbo Pascal to run under IBM, Hercules standards

The University of California at Berkeley Campus Software Office developed Turbo Graphic Tools, a transportable graphics library for Borland International, Inc.'s Turbo Pascal program.

Turbo Graphics Tools is a library of graphics primitives which, according to the vendor, overcomes the hardware differences of the Hercules, IBM Color Graphics Adapter (CGA) and IBM Enhanced Graphics Adapter (EGA) standards.

The Hercules Graphics Adapter offers a resolution of 720 by 348 pixels and two colors; the IBM CGA offers 640- by 200-pixel resolution and two colors; and the IBM EGA offers a resolution of 640 by 350 pixels and 16 colors.

According to a spokeswoman from University of California at Berkeley, Turbo Graphics Tools was designed for programmers who wish to write transportable Turbo Pascal graphics programs capable of running under both the IBM and the Hercules graphics standards. The same compiled code is said to run on any of the three adapters.

According to the spokeswoman, the library resides in less than 12K bytes of memory and runs on any IBM Personal Computer with Turbo Pascal.

The software determines the hardware configuration and selects the graphics mode offering the highest resolution and most colors.

Turbo Graphic Tools is available from the University of California at Berkeley Campus Software Office for $100. All source code and documentation are included.

SOFTWARE & SERVICES

Systems software

Honeywell, Inc. has announced that its **CP-6** operating system is available on its DPS 90 information processing system.

According to the vendor, CP-6 on the DPS 90 is intended for engineering and scientific applications, such as finite element analysis or solids modeling. It allows users to take advantage of the DPS 90 Integrated Vector Processing without requiring special coding techniques.

CP-6 features time-sharing, batch processing and transaction processing.

Prices start at $20,000 per month.

Honeywell Manufacturing Systems Division, 2222 W. Peoria Ave., Phoenix, Ariz. 85029.

■

Century Analysis, Inc. has ported **Star**, its combined office and data system, to the NCR Corp. 9800 computer.

The Star system includes a set of integrated office tools for interuser communication, personal information manipulation and desk organization as well as multiuser data storage and retrieval and capabilities for interpretive development.

Star includes a networked office processing subsystem, a fourth-generation development language, a relational data base management system, a management query language and utilities.

Star is priced from $10,000.

Century Analysis, 114 Center Ave., Pacheco, Calif. 94553.

■

Graphic Software Systems, Inc. has announced that its **GSS-GKS** graphical kernel system development package is available for the IBM RT Personal Computer.

According to the vendor, GSS-GKS enables the user to port mainframe, mini and microcomputer graphics applications to RT PC systems. It also allows Microsoft Corp. MS-DOS- or IBM PC-DOS-based personal computers to connect to the RT PC as intelligent graphics workstations.

GSS-GKS supports two standard metafile formats, the GKS Metafile and the Virtual Device Metafile.

GSS-GKS costs $795.

Graphic Software Systems, 9590 SW Gemini Drive, Beaverton, Ore. 97005.

Applications packages

Computer Associates International, Inc. has added the **CA-Fund Accounting System** to its Advanced Business Software series of financial management applications for IBM's DOS/VSE and MVS operating systems.

The system was designed for public and nonprofit organizations. It provides general ledger, purchasing and accounts payable fund management capabilities.

The Advanced Business Software series is on-line and integrated. It is said to provide real-time updating.

The CA-Fund Accounting System is priced at $213,000 for the DOS/VSE environment and $256,500 for the MVS environment

Computer Associates, 711 Stewart Ave., Garden City, N.Y. 11530.

■

Access Technology, Inc. has announced **Version** 1.1 of its **20/20** integrated spreadsheet for Prime Computer, Inc. systems running Primos 19.4 or higher.

Version 1.1 reportedly offers support for PT 200 and Visual 550 graphics terminals and the Hewlett-Packard Co. HP7550 eight-pen plotter. It also offers increased print spooling options support.

Other enhancements include the ability to nest command procedures and an expanded model link or consolidated capability.

The spreadsheet costs from $500 to $15,000.

Access Technology, Six Pleasant St., S. Natick, Mass. 01760.

Languages

Language Processors, Inc. has ported its **LPI-RPG II** compiler to the AT&T Information Systems 3B family running under AT&T Unix System V.

According to the vendor, it features a high-performance optimizer, an interactive source-level debugger and cross-language calling, which enables programmers to employ multiple LPI languages in a single application.

LPI-RPG II is compatible with IBM System/34 computers.

End users are said to be able to port existing RPG-II applications to an AT&T system.

The LPI-RPG II compiler is priced at $3,000 for the 3B2 and $5,000 for the 3B5.

Language Processors, 400-1 Totten Pond Road, Waltham, Mass. 02154.

■

Hewlett-Packard Co. has introduced a validated **Ada compiler** for use on its HP 9000 Series 200 and 300 technical workstations.

The compiler runs under HP-UX, which adheres to AT&T's System V Interface Definition Issue I and provides access to all HP-UX system services and utilities.

In addition to Ada program development, HP-UX provides an environment for program development in Fortran, Pascal, C, 680X0 Assembly, Common LISP and Technical Basic.

The Ada compiler costs $3,125 for the single-user version and $4,275 for the multiuser version.

HP, 3000 Hanover St., Palo Alto, Calif. 94304.

Zeta Soft, Ltd. has announced **Release 1.1 of Zeta-C**, a C compiler and development environment for Symbolics, Inc.'s 3600 series LISP machines.

According to the vendor, Zeta-C 1.1 is an implementation of industry standard C. It is compatible with the AT&T Unix System V compiler as well as the University of California at Berkeley Unix 4.2 compiler.

Features of the product include incremental compilation, runtime bounds checking on array and pointer references and an interactive C-syntax debugger.

Zeta-C Release 1.1 includes a user's guide and six months of support.

It costs $5,800 for the initial CPU license plus $1,000 for each additional CPU at the site.

Zeta Soft, P.O. Box 139, 94 Sciarappa #2, Cambridge, Mass. 02141.

Utilities

Compinfo, Inc. has announced **Findit**, a software utility for the Wang Laboratories, Inc. Wang VS series of computers.

Findit is said to allow users to find any file or library in a system.

The utility features wild card characters that reportedly enable users to find any part of a name including leading characters, trailing characters, embedded characters or a combination.

Findit integrates with six other Compinfo modules for functions such as reorganizing index files and copying multiple files.

The Findit system is priced from $300 to $500 depending on the utility functions purchased.

Compinfo, 381 Park Ave. S., New York, N.Y. 10016.

Sterling Software, Inc.'s Dylakor Division has introduced a **DOS/VSE version** of the **interface** between its DYL-280 and DYL-280 II information management products and Cullinet Software, Inc.'s IDMS/R data base.

The module utilizes statements predominant in the IDMS/R Cobol Data Manipulation Language and supports all IDMS/R verbs, according to the vendor.

Users can retrieve and update conventional records, Logical Record Facility records and IDMS/R table entries from IDMS/R data bases.

Access to IDMS/R integrated data dictionaries is also provided, the vendor said.

The DOS/VSE version of the interface is priced at $8,690 for customers who already own DYL-280 or DYL-280 II.

Sterling Software, Dylakor Division, 17418 Chatsworth St., Granada Hills, Calif. 91344.

◆

Integrated Virtual Systems has announced **Release 2.0** of its **CL-1** productivity series package for Elxsi Co. System 6400 computers using EMBOS SR-11.

The package is said to allow Digital Equipment Corp. VMS and Apollo Computer, Inc. Aegis users to become productive in the Elxsi System 6400 environment.

CL-1 features file handling functions such as listing directories and copying files, hierarchical menu processing and support for electronic mail, remote printing and plotting and implementation of remote job submittal.

CL-1 is priced at $5,000.

Integrated Virtual Systems, 46627 Paseo Padre Pkwy., Fremont, Calif. 94539.

◆

Advanced Technology Center has announced **Grafpak-CGM**, computer graphics metafiles available as Grafpak-GKS workstation modules.

According to the vendor, Grafpak-CGM enhances Graphical Kernal System (GKS) performance by providing long-term picture storage and transfer of images to computers and devices. Pictures created with GKS can be saved to be reused on the same system or on any compatible graphics system.

Grafpak conforms to the binary, character and clear text encoding formats of the ANSI/ISO Computer Graphics Metafile standard.

Grafpak-CGM costs $2,500. The personal computer version costs $500.

Advanced Technology Center, Suite 238, 5711 Slauson Ave., Culver City, Calif. 90230.

Data base management systems

Tom Software, Inc. has announced **Release 5.0** of its **Speed II** fourth-generation productivity tool and integrated data base management system.

Added features include a substring search, added memory files, enhanced application navigation and the ability to create, modify or delete records in a related master file without leaving the current function.

Speed II is said to integrate with Wang Laboratories, Inc. products, including Decision Support Software and Wang Office.

Speed II is priced from $10,000.

Tom Software, P.O. Box 66596, 127 S.W. 156th, Seattle, Wash. 98166.

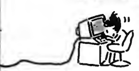
Services

Electronic Catalog, Inc. has introduced **Electronic Catalog**, an on-line service said to provide information on microcomputer manufacturers, distributors, products and pricing.

The system is menu-driven and includes a Help facility. Features of the service include searches and listings of product families, functionalities, emulations and product clones.

The standard price of the service is $50 per hour with a minimum of one hour per month.

Electronic Catalog, 317 E. San Rafael, Colorado Springs, Colo. 80903.



MICROCOMPUTERS

Software applications packages

Harris/Lanier Business Products, Inc. has introduced **Harrisdesk**, a word processing package for personal computers.

Harrisdesk is said to feature the vendor's Perspective user interface, Task and Speller. It can be run in a multiuser configuration via the Concept 4300 personal computer work group server or as a stand-alone product on the Harris 2000 Personal Computer or any IBM-compatible personal computer.

The Speller function uses a 90,000 word dictionary and a 6,500 word user-definable dictionary to verify spelling. Task allows users to write programs for frequently performed tasks.

Harrisdesk costs $695.

Harris/Lanier, 1700 Chantilly Drive N.E., Atlanta, Ga. 30324.

■

Lowell Systems, Inc. has announced **Time-Trak L3000**, a time and attendance package for Microsoft Corp. MS-DOS-based systems.

Time-Trak L3000 is said to generate management reports including daily absentee and tardy rolls, payroll and daily cost per work center.

It includes a module for productivity monitoring that tracks time spent by each employee on specific jobs and is capable of host communications for internal financial functions.

The aystem uses slot readers, function keys and a variety of scanning devices. Each employee is issued a bar-coded ID badge.

Time-Trak L3000 is priced from $12,000.

Lowell Systems, 140 Industrial Ave. E., Lowell, Mass. 01852.

■

Academic Press, Inc. has announced **Graph-Pad**, software said to produce graphs of scientific data.

The program offers flexible data entry, data manipulation and plotting. Users can enter data from existing graphs, type onto a built-in spreadsheet, read disk files created by Graph-Pad, Lotus Development Corp.'s 1-2-3 and other programs and save data on a diskette.

Other features include the ability to average replicate values, calculate and plot error bars, mathematically transform data, calculate linear regression and plot the best-fit line.

Graph-Pad runs on an IBM Personal Computer or compatible. It costs $340.

Academic Press, Orlando, Fla. 32887.

Software languages

Ryan-McFarland Corp. and **AT&T** have announced **Unix versions of RM/Fortran** and **RM/Cobol** for the AT&T Personal Computer 6300 Plus.

RM/Fortran is a complete implementation of the Fortran 77 standard. The AT&T Unix System V implementatión executes the same source code developed for Microsoft Corp. MS-DOS and IBM PC-DOS implementations.

According to the vendor, RM/Fortran applications run faster on the Intel Corp. 80286-based PC 6300 Plus than on the Intel 8088-based PC.

RM/Cobol is an ANSI 74 Cobol implementation.

The products are priced at $895 each.

Ryan-McFarland, 609 Deep Valley Drive, Rolling Hills Estates, Calif. 90274.

Software utilities

Pro-Log Corp. has announced the **STD LIB 1.1**, a software library of initialization and driver routines said to allow application programs written in Basic, C or assembly language to link to STD Bus I/O cards.

The library supports the vendor's STD DOS system. It provides complete hardware initialization and I/O routines and consists of modules written in assembly language. Each module includes a set of routines related to a single I/O card or a family of cards. The library is delivered on two 5¼-in. IBM Personal Computer-compatible diskettes and comes with a manual.

STD LIB 1.1 costs $295.

Pro-Log, 2560 Garden Road, Monterey, Calif. 93940.

■

FEL Compating has unveiled **Release 2.0** of the **Mobius** micro-to-host integration system.

Mobius is said to allow transparent interaction between Digital Equipment Corp. hosts and a variety of microcomputers. Features of Release 2.0 include task-to-task communication, enhanced DEC VT100 emulation, a task definition facility and the ability to define as many as 26 micro disk drives on the host system and assign each a descriptive volume label.

The price for a system supporting up to five simultaneous users is $3,500 for the host and $250 each for the microcomputers

FEL Computing, P.O. Box 72, 10 Main Street, Williamsville, Vt. 05362.

Software enhancements

Micrografx, Inc. has released **In-a-Vision Version 1.2**, an upgrade of its computer-aided design program for the IBM Personal Computer and compatibles.

Enhancements include command execution during redraw, an add window command, smaller dialogue boxes, an align command and simpler pie and elliptical arc creation.

Version 1.2 is available to registered users for $49.

Micrografx, 1820 N. Greenville, Richardson, Texas 75081.

■

Applied Business Technology Corp. has announced **Project Workbench Release 2.2**, an enhanced version of its project management soft-

Continued on page 92

NEW PRODUCTS/MICROCOMPUTERS

Continued from page 91

ware package for IBM Personal Computers and compatibles.

Release 2.2 includes local-area network support, subproject capability, expanded scheduling and reporting capabilities, an expanded dependency network, expanded user interfaces and support for additional hardware, including plotters.

Project Workbench Release 2.2, including manual and on-line tutorial, costs $1,150. There is an optional annual maintenance fee of $250.

Applied Business Technology, 6th Floor, 365 Broadway, New York, N.Y. 10013.

■

Profidex Corp. has released **Revision 2.2** of its sales and marketing software package **Scamp**.

Scamp is said to support telemarketing, direct mail and field sales. It is available for all Data General Corp. multiuser computer systems as well the IBM Personal Computer family and compatibles.

Scamp provides data retrieval and update, management reporting options, data import and electronic lead distribution features, autodialer interface, automatic mail merge file production and six levels of security.

It costs $695 for microcomputers and starts at $3,000 for DG minis.

Profidex, 90 West St., New York, N.Y. 10006.

Communications

Questronics, Inc. has announced **Analycon**, a data communications performance analyzer for the IBM Personal Computer XT and compatibles.

According to the vendor, Analycon controls a set of Questronics' Multi-Line Analyzer Systems, up to 255 lines, and data base information regarding network performance. It coordinates the data collection, data basing and reporting of information and provides statistical reports and graphical presentations.

Analycon costs $3,495.

Questronics, 3570 S.W. Temple, Salt Lake City, Utah 84115.

■

Braegen Corp. has added **PC Networking Products** to its Elan System of IBM 3270-compatible products.

The line is said to allow networked IBM Personal Computers to directly access IBM mainframe channels via a single coaxial cable. The products are compatible with IBM's Netbios standard and run under IBM's PC Network Control Program or Novell Inc.'s Advanced Netware

The series includes the Elan Network Adapter Card, priced at $1,295; the Elan Server Adapter for the IBM Personal Computer AT, priced at $2,495, and the Elan File Server, priced at $17,995

Braegen, 525 Los Coches St., Milpitas, Calif. 95035.

■

Gateway Communications, Inc. has announced the **Wide-Area Network Interface Module 186** (WNIM-186), a coprocessor option board for IBM Personal Computers.

The board supports communications speeds up to 800K bit/sec. It also supports various data transmission techniques including asynchronous, bisynchronous, CCITT X.25 and Systems Network Architecture/Synchronous Data Link Control.

The board costs $695 with 128K bytes of memory and $795 with 512K bytes.

Gateway Communications, 16782 Red Hill Ave., Irvine, Calif. 92714

Data storage

Syquest Technology has announced the **SQ1500** family of integrated, removable hard disk subsystems for IBM Personal Computer XTs, ATs and compatibles.

Four models are available with single or dual removable drives or in a fixed drive/removable drive combination. A subsystem chassis houses two drives providing up to 90M bytes of fixed and removable on-line data storage. Data transfer rates are 7.5M bit/sec.

Prices for the subsystems range from $2,499 to $3,695

Syquest Technology, 47923 Warm Springs Blvd., Fremont, Calif. 94539.

■

Vero Electronics, Inc. has announced the **451 48055, 3U form factor** and the **452 48056, 6U form factor**, two modules said to provide VMEbus-compatible 1M-byte dynamic random-access memories.

The modules feature 24-bit addressing with flexible address modifier decoding, addressability on any 64-byte boundary within the 16M-byte space, byte parity error detection and eight- or 16-bit data transfers.

The 451 48055 costs $899, and the 452 48056 costs $899.

Vero Electronics, 40 Lindeman Drive, Trumbull, Conn. 06611.

■

Optotech, Inc. has introduced a **write-once optical storage system** said to support the small computer systems interface (SCSI).

The storage system reportedly includes a 200M-byte-per-side disk drive, controller and software tools. The SCSI storage system is built around the Model 5984 write-once, read-only optical disk drive that provides a data transfer rate of 2.2M bit/sec.

The SCSI system drives are priced from $975 to $3,400 and the controllers from $350 to $550.

Optotech, 770 Wooten Road, Colorado Springs, Colo. 80905.

Printers/Plotters/Peripherals

Panasonic Industrial Co. has unveiled three **IBM-compatible monitors** for graphics and text displays featuring 80-line by 25-char. screens.

The TR-125M9T monochrome monitor offers 640- by 640-pixel resolution and displays 16 shades; a two-shade text mode offers 720- by 350- pixel resolution, and an alternate text mode offers 640- by 350-pixel resolution.

Model C-1310 is a 13-in. red-green-blue (RGB) monitor that displays 16 colors with 640- by 200-pixel resolution.

Model C-1350 is a 13-in. RGB monitor that displays 16 shades of 64 colors. It offers either 640- by 200- or 640- by 350-pixel resolution.

Prices for Models TR-125M9T, C-1310 and C-1350 are $199, $599 and $699, respectively.

Panasonic, One Panasonic Way, Secaucus, N.J. 07094.

■

Ziyad, Inc. has announced the **Paperjet 400**, a dual-sheet and envelope feeder.

The Paperjet 400 is said to automatically feed letter, 13-in. legal, 14-in. legal, monarch and European DIN A-size paper.

Users can store up to three different kinds of stationery at the same time, according to the vendor.

The Paperjet 400 is available for laser printers including the Wang Laboratories, Inc. LPS8, the Hewlett-Packard Co. Laserjet and Laserjet Plus and Canon, Inc. LPB-8 printers. It costs $1,895.

Ziyad, 100 Ford Road, Denville, N.J. 07834.

■

Ziyad, Inc. has announced the **Paperjet 2000**, an office print station.

The Paperjet 2000 features a letter-quality printer, cut-sheet paper and envelope feeder and accoustical sound hood.

It is said to print at more than 63 char./sec. and has both serial and parallel connector ports to connect with various hosts.

According to the vendor, the printer can also emulate printers including the Qume Corp. Sprint II, Diablo Systems, Inc. 630 and NEC Corp. 3550.

The Paperjet 2000 is priced at $44,495.

Ziyad, 100 Ford Road, Denville, N.J. 07834.

■

Thomson Consumer Products Corp. has announced the **VM3801DA/DG** 15-in. monochrome monitor, said to support 132-col. displays and transform color signals into 16 shades of amber or green.

The monitor features a dual-scan monitor and operates at both 15.7 kHz and 18.4 kHz. It has a built-in D-9 connector, so it can be plugged into both monochrome and color graphics adapters.

The VM3801DG with a green display costs $239. The VM3801DA with an amber display costs $249.

Thomson Consumer Products, #111, 6731 W. Slauson Ave., Culver City, Calif. 90230.

■

PC's Limited has announced a **monitor**, said to support enhanced graphics with up to 64 colors at 720- by 350-pixel resolution, and **Egads**, an enhanced graphics adapter.

The 13-in. monitor is also said to support standard color or graphics cards with 16 colors. The text mode allows switching to green for word processing.

Egads is said to support both color and monochrome displays. It comes with a light-pen interface. The card features a 256K-byte bit-mapped graphics buffer and a random-access memory-loadable character generator.

The monitor costs $479, and Egads costs $269.

PC's Limited, Building Three, 1611 Headway Circle, Austin, Texas 78754.

■

Softcorp, Inc. has enhanced its **Sidestep** horizontal printing program for IBM Personal Computers and compatibles and dot matrix printers.

Sidestep is said to rotate an entire document 90 degrees. It includes improved font files that enable it to print more of the extended ASCII character set than before.

Sidestep costs $60. Registered Sidestep users can upgrade for $10.

Softcorp, Suite 244, 2340 State Road 580, Clearwater, Fla. 33575.

■

Fujitsu America, Inc. Peripheral Products Division has announced that the **IBM Proprinter command set** is available for its Model DX2100 and DX2200 dot matrix printers.

According to the company, the command set is available on a single personality card that is switch-selectable between IBM Proprinter and IBM graphics printer commands.

The IBM Proprinter command set including an 8K-byte buffer costs $75.

Fujitsu America, 3055 Orchard Drive, San Jose, Calif. 95134

■

Panasonic Industrial Co. has announced the **KX-P1080AP** dot matrix printer, said to be compatible with Apple Computer, Inc.'s Macintosh and Apple IIC.

The printer has a built-in RS-232C adapter. It prints near-letter quality in all pitches at 24 char./sec. and **draft quality** at 90 char./sec.

The KX-P1080AP costs $379.

Panasonic, One Panasonic Way, Secaucus, N.J. 07094.

Houston Instrument has introduced the multipen **PC Plotter**.

The PC Plotter features a four-pen carousel and plots on paper, vellum or overhead transparencies. The plotter contains Houston Instrument's DM/PL plotting language and, according to the vendor, can be used with hundreds of graphics software packages.

Two models are available. The PC Plotter 595 enables users to produce 8½- by 11-in. graphics, and the PC Plotter 695 allows for both 8½- by 11-in. and 11- by 17-in. graphics. Both models work with any computer containing a standard RS-232C-compatible interface and feature a resolution of 0.004 in. and a plotting speed of up to 4.2 in./sec.

The PC Plotter 595 costs $699, and the PC Plotter 695 costs $799.

Houton Instrument, 8500 Cameron Road, Austin, Texas 78753.

■

C. Itoh Digital Products, Inc. has introduced the **Prowriter C-315** and **Prowriter C-310 XP** dot matrix printers.

The C-315 is a 136-col. wide-carriage printer said to feature speeds up to 300 char./sec., bottom, top and rear paper feed and a push/pull tractor. Other features include a graphic resolution of up to 240 by 216 dot/in., an 8-bit parallel or RS-232 serial interface and a variety of resident character fonts.

The Prowriter C-310 XP lets users choose between Epson America, Inc. FX-85 and IBM Proprinter emulation. It also features print speed up to 300 char./sec. and a resolution of up to 240 by 216 dot/in.

The C-315 costs $819 and the C-310 XP costs $649.

C. Itoh, Suite 220, 19750 S. Vermont Ave., Torrance, Calif. 90502.

■

C. Itoh Digital Products, Inc. has announced the **Chroma Pro CM 3000** red-green-blue monitor and the **Chroma Pro CM 4000** enhanced graphics adapter-compatible monitor.

The CM 3000 is said to function as a monochrome monitor at the flick of a switch. For color graphics, it offers a resolution of 640 by 240 pixels.

The CM 4000 incorporates both high-resolution, enhanced 640 by 350 pixel and medium-resolution 64 by 240 pixel color graphics displays, conforming to IBM standards.

The Pro CM 3000 costs $649, and the Pro CM 4000 costs $799.

C. Itoh, Suite 220, 19750 S. Vermont Ave., Torrance, Calif. 90502.

■

Star Micronics, Inc. has introduced the **NL-10**, a nine-wire dot matrix desktop printer.

The NL-10 is said to print draft quality at 120 char./sec. and near-letter quality at 30 char./sec. It features plug-in interface cartridges available for the IBM Personal Computer and compatibles, the Commodore Business Machines, Inc. 64/128 and standard parallel computers.

The NL-10 is priced at $319. Each interface cartridge costs $60.

Star Micronics, Suite 3510, 200 Park Ave., New York, N.Y. 10166.

■

Diconix, Inc. has introduced the **Diconix 150**, a portable battery-powered ink-jet printer.

The Diconix 150 prints on single sheets of letterhead or continuous-feed computer paper with near-letter quality at speeds up to 150 char./sec. in draft mode. It connects to computers with a Centronics Data Computer Corp. 8-bit parallel interface and has full emulation of the IBM Proprinter or the Epson America, Inc. FX printer.

The Diconix 150 costs $479.

Diconix, 3100 Research Blvd., Dayton, Ohio, 45420.

Board level devices

Computer Peripherals, Inc. has announced the **Overachiever** enhancement board for the IBM Personal Computer XT and AT.

The Overachiever includes 1.5M bytes of memory, expandable to 3M bytes with a piggyback board. The board includes two software packages: Flip-Up, which performs 13 office functions such as calculating and data transfer, and a utility software package, which offers disk management and printer spooling management.

The Overachiever costs $595.

Computer Peripherals, 2635 Lavery Court, Newbury Park, Calif. 91320.

■

Everex Systems, Inc. has introduced a **graphics board** combining its Piggyback enhanced graphics adapter (EGA) board with its Enhanced Evergraphics board, a Hercules Computer Technology, Inc.-compatible monochrome adapter.

The combined board, which occupies a single expansion slot, is said to support enhanced color graphics on an enhanced monitor while supporting monochrome text on a monochrome monitor at the same time.

The product is priced at $350 for the Piggyback EGA, $249 for the Enhanced Evergraphics board alone and $599 for the combined boards purchased as a unit.

Everex Systems, 48431 Milmount Drive, Fremont, Calif. 94539.

■

Verbatim Corp. has announced **Datalife Databank** 30M-byte and 30M-byte plug-in cards and **Datalife CPU-Card**, a half-slot accelerator card, for the IBM Personal Computer family.

Datalife Databank occupies 1½ ex-

NEW PRODUCTS/MICROCOMPUTERS

pansion slots. Access time is 78 msec, and the product supports hard disks of any capacity as well as the Xenix operating system from Microsoft Corp. It features a 3¼-in. hard disk with automatic locking heads.

Datalife CPU-Card is said to replace the Intel Corp. 8088 microprocessor chip with the 80286.

The 30M-byte Datalife Databank costs $1,445, and the 20M-byte model costs $1,195. The Datalife CPU-Card costs $745.

Verbatim, 323 Soquel Way, Sunnyvale, Calif. 94086.

■

Genoa Systems Corp. has announced the **Spectrum Plus** graphics card as well as a reduced-size version of its **Spectrum Prime** graphics card.

Spectrum Plus, designed to take advantage of the 640K-byte random-access memory of the IBM Personal Computer XT, features extra functions such as clock and calendar, serial port and parallel port in addition to the Spectrum card's graphics functions.

Spectrum Prime fits any slot in the IBM Personal Computer and runs at speeds up to 9 MHz. It features compatibility with all monochrome and color monitors.

Spectrum Plus costs $499. Spectrum Prime costs $399 with parallel printer port and $349 without.

Genoa Systems, 73 E. Trimble Road, San Jose, Calif. 95131.

■

Definicom Systems, Inc. has announced the **DSI** family of 32-bit coprocessor boards for IBM-compatible personal computers.

The boards are said to provide full 32-bit minicomputer architecture. Features include 32-bit very large-scale integration circuits said to run at a minimum of 10 MHz.

The basic board features up to 2M bytes of random-access memory (RAM). Larger boards are available with up to 12M bytes of RAM.

Prices start st $1,495.

Definicom Systems, Suite 108, 31324 Via Colinas, Westlake Village, Calif. 91362.

■

Intelligent Data Systems, Inc. has introduced the **PC-88 Turbo High Speed Personal Computer** and the **PC-286 Advanced Technology Personal Computer** processors.

The PC-88 is said to be IBM Personal Computer XT compatible. It operates at 4.77 MHz and 8 MHz. The product features a 16-bit Intel Corp. 8088-2 microprocessor and Microsoft Corp. MS-DOS 2.11 as well as 256K bytes of random-access memory (RAM).

The IBM Personal Computer AT-compatible PC-286 features the Intel 80286 processor and 512K bytes of RAM.

The PC-88 costs $1,275, and the PC-286 costs $3,360.

Intelligent Data Systems, 14932 Gwenchris Court, Paramount, Calif. 90723.

■

Intelligent Data Systems, Inc. has announced the **B-420** high-resolution text and graphics card for the IBM family of Personal Computers and compatibles.

The B-420 is a full-size Hercules Computer Technology, Inc.-compatible card featuring a resolution text mode with a capacity of 1,440 dots by 348 lines and an 18- by 14-char. box. In its high-resolution graphics mode, it contains 720 dots by 348 lines.

The B-420 costs $195.

Intelligent Data Systems, 14932 Gwenchris Court, Paramount, Calif. 90723.

■

Intelligent Data Systems, Inc. has announced the **EGA+** card, said to operate in 16 different text and graphics modes.

The card includes 256K bytes of random-access memory. It is a half-size card that supports the IBM family of Personal Computers and compatibles. It offers emulation of IBM's Enhanced Graphics Adapter with a resolution of 640 dots by 350 lines and Color Graphics Adapter with 320-dot by 200-line resolution.

EGA+ costs $465.

Intelligent Data Systems, 14932 Gwenchris Court, Paramount, Calif. 90723.

■

Everex Systems, Inc. has introduced the **Enhancer** board, an enhanced graphics adapter video card said to be compatible with the IBM Enhanced Graphics Adapter.

The Enhancer includes a parallel printer port and 256K bytes of display memory and comes with the vendor's Egmode software. It also is said to provide 640- by 350-pixel resolution in 16 colors from a palette of 64 colors.

The Enhancer board costs $425.

Everex Systems, 48431 Milmount Drive, Fremont, Calif. 94539.

■

Independent Business Systems, Inc. has announced a 12-slot and a 20-slot **S-100 Motherboard**.

Based on the IEEE-696 standard, the boards include a battery backed-up clock and calendar. According to a company spokesman, the boards are actively terminated at both ends and were designed to reduce radio frequency interference on the bus.

The 12-slot Motherboard is priced at $250, and the 20-slot board is priced at $300.

Independent Business Systems, 5915 Graham Court, Livermore, Calif. 94550.

WHATEVER YOUR NETWORKING NEEDS,

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Maybe it's simply linking all the personal computers in one department so they can share information.

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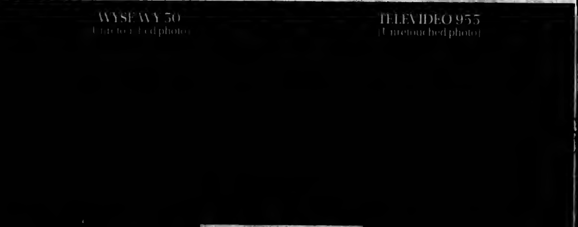

TELEVIDEO 955 VS. WYSE WY-50 AND WY-50+			
FEATURES	TVI 955	WY-50	WY-50+
Screen Color	Green or Amber	Green Only	Amber Only
Optional Graphics model	Yes	No	No
Dynamically allocated non-volatile function key memory	512	128	140
Maximum non-volatile bytes per function key	256	4	64
High contrast super dark Matsushita screen	Yes	No	No
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Sure, most $600 terminals can scrunch 132 columns onto a 14" screen. But you need a magnifying glass to read them.

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NEW PRODUCTS/MICROCOMPUTERS

Independent Business Systems, Inc. has announced the **Slavenet 186/512**, a 16-bit slave based on the 10-MHz Intel Corp. 80186 CPU.

The Slavenet 186/512 was designed for use in the IEEE S-100 bus. It features two serial ports with either 256K bytes, 512K bytes or 1M byte of dynamic random-access memory (RAM).

According to the vendor, it is capable of true 16-bit data transfers at 2M bit/sec

Prices range from $995 for an 8-MHz 80186 with 256K bytes of RAM to $1,512 for a 10-MHz 80186 with a full megabyte of RAM.

Independent Business Systems, 5915 Graham Court, Livermore, Calif. 94550.

■

Gespac, Inc. has introduced the **GESMPU-48**, a Motorola, Inc. 68000-based microcomputer board.

The board is built on a single-height eurocard and is compatible with the G-64 16-bit microcomputer bus. It uses a leadless 68000 microprocessor running at 8 MHz and can accommodate up to 64K bytes of CMOS random-access memory and 128K bytes of on-board erasable programmable read-only memory. The board also features three programmable timers and an RS-232 serial port. It can address up to 8M bytes of external memory.

The GESMPU-4B is priced at $395.

Gespac, 100 W. Hoover Ave., Mesa, Ariz. 85202.

■

Orchid Technology has announced the **Turbo PGA**, an IBM PGC-compatible graphics board for the IBM Personal Computer AT and RT.

The Turbo PGA offers a resolution of 640 by 480 pixels with 256 displayable colors out of a palette of more than a quarter-million colors. It features an on-board 8-MHz Intel Corp. 80186 processor and is said to be able to achieve a peak fill rate of 300 million pixel/sec.

The Turbo PGA costs $1,495.

Orchid Technology, 47790 Westinghouse Drive, Fremont, Calif. 94539.

■

Orchid Technology has introduced the **Turbo EGA** single-slot enhanced graphics adapter (EGA) for IBM Personal Computers.

According to the vendor, the Turbo EGA contains four video adapters, 256K bytes of graphics memory and an Intel Corp. 80286 processor. It is compatible with the IBM EGA, Color Graphics Adapter, MDA and the Hercules graphics card.

The Turbo EGA card costs $945.

Orchid Technology, 47790 Westinghouse Drive, Fremont, Calif. 94539.

■

Pro-Log Corp. has introduced **STD DOS Model OD 1.2**, a two-card configuration of its STD DOS system.

STD DOS is Microsoft Corp.'s MS-DOS 3.1 on industrial-quality STD DOS hardware.

The system consists of two circuit boards. The 7863 multifunction CPU card includes an Intel Corp. 8088 microprocessor, a BIOS programmable read-only memory (ROM), a clock and a tick interrupt.

The second board, a 7710 memory card, provides MS-DOS 3.1 in a 128K-byte ROM disk, a 128K-byte ROM disk for user programs, a 16K-byte work space random-access memory (RAM) and 112K bytes of static system RAM.

The Model OD 1.2 costs $1,195.

Pro-Log, 1560 Garden Road, Monterey, Calif. 93940.

■

TAT Graphics Group, Inc. has announced the **Galaxy GA1024**, a color graphics display controller board for use with personal computer computer-aided design systems.

The board is said to offer a noninterlaced 1,024- by 768-pixel display. It requires a red-green-blue monitor with a 48-kHz horizontal scan frequency. The Second Page option reportedly allows instant switching between two pictures on a single monitor.

The GA1024 costs $42,295. The Second Page option costs $300.

TAT Graphics Group, Building E, 1270 Lawrence Station Road, Sunnyvale, Calif. 94089.

Auxiliary equipment

Advanced Input Devices has unveiled the IBM-compatible **Ergokey EKT 82** keyboard.

The keyboard features 82 keys. It is said to be smaller in width than conventional keyboards and therefore suitable for travel. It features nonsilicone elastomer switch-mat switch technology.

The Ergokey EKT 82 costs $118.75.

Advanced Input Devices, W. 250 AID Drive, Coeur d'Alene, Idaho 83814.

COMMUNICATIONS

Controllers

Raycom Systems, Inc. has introduced the **Raycom 3200**, an IBM coaxial-compatible fiber data link.

The Raycom 3200 is said to allow optical-fiber replacement of coaxial cable used to interconnect the IBM 3274/3276 controller to 3278 terminals. It may also be used between Model 3299 coax multiplexers or between a remote multiplexer and its interconnected terminals.

The Raycom 3200 operates at a data rate of 2.36M bit/sec. It costs $695 a pair.

Raycom Systems, 6395 Gunpark Drive, Boulder, Colo. 80301.

Voice/data communications

Communications Analysis Corp. has announced the **Satellite-2M**, a private branch exchange data collection device.

The package consists of a 2M-byte call buffer, a 1,200 bit/sec. modem, cable and Microsoft Corp. MS-DOS-based software. The unit connects to any private branch exchange's station message detail recording output using RS-232 cable. Its output connects to any standard telephone line with a modular RJ-11 plug

The Satellite-2M holds from 15,000 to 32,000 call records. Records are transmitted to the call buffer and can be retrieved using an IBM

Continued on page 100

Continued from page 99

Personal Computer and a modem.

The package costs $2,495.

Communications Analysis, 100 Fountain . St., Framingham, Mass. 01701.

■

Kurzweil Applied Intelligence, Inc. has introduced the **KVS Porting Manual** and the **KVS Run-Time Library** for programmers wishing to integrate the Kurzweil Voicesystem (KVS) speech recognition device with host computers and operating systems.

The manual is said to describe the design, testing and operation of the KVS host-resident software. The runtime library is a collection of software subroutines called from a voice application program.

The KVS Porting Manual costs $2,500; a separate copy of the KVS runtime library costs $1,000. The KVS costs $6,500.

Kurzweil Applied Intelligence, 411 Waverly Oaks Road, Waltham, Mass. 02154.

■

Honeywell, Inc. has announced the **Delta-Plex Series 500** voice/data private branch exchange system, said to accommodate up to 120 stations initially, expandable to 240 stations.

The Series 500 includes a family of instruments. The CS10 is a 10-button programmable telephone with status lights and monitor capabilities. The CS20 is a 10-button programmable telephone with status lights, speakerphone and a 20-char. alphanumeric display. The CSD model is a 20-button digital set with speakerphone and menu-driven 80-char. display.

The Delta-Plex Series 500 is priced from $550 to $800 per station line.

Honeywell, Honeywell Plaza, Minneapolis, Minn. 55408.

Protocol converters

Industrial Networking, Inc. has introduced the **MIU-40 MAP Interface Unit**, a general-purpose Manufacturing Automation Protocol (MAP) interface.

The interface is said to enable most MAP host systems or factory automation devices to attach to the vendor's MAP/One local-area network system. The MIU-40 includes a controller board, a 10M bit/sec. token-bus modem board and the vendor's custom dual gate-array chip set.

Data is passed from the host to the MIU-40 at 56K bit/sec. using the High-Level Data Link Control serial communications protocol.

The unit is priced at $5,100.

Industrial Networking, 3900 Freedom Circle, Santa Clara, Calif. 95052.

■

Kentrox Industries, Inc. has introduced the **Slick Switch**, a T1 interface system said to provide digital termination for T1 subscriber and loop carrier systems at the fiber interface.

The Slick Switch provides error detection, format conversion capability and automatic protection switching compatible with AT&T's SLC-96. It is integrated with provisions for order wiring and fault locating and is said to be the first application set for the vendor's T-Term T1 facilities terminal.

Prices for typical configurations range from $2,000 to $5,000.

Kentrox Industries, P.O. Box 10704, 14375 N.W. Science Park Drive, Portland, Ore. 97210.

Software

Network Software Associates, Inc. has announced **Synctalk**, a peer-to-peer synchronous communications and file transfer program for IBM Personal Computers and compatibles.

Synctalk is said to allow two personal computers to communicate and exchange files at speeds up to 9.6K bit/sec. using IBM's Synchronous Data Link Control protocol. Synctalk features data compression techniques, support of leased and dialed lines, Help screens, password protection and optional automatic dialing and call-directory features.

Other features include interactive message exchange and file transfer capabilities.

Synctalk costs $195.

Network Software Associates, 22982 Mill Creek, Laguna Hills, Calif. 92653.

■

Honeywell, Inc. has announced **Mapstart**, a development tool for integrated automation using Manufacturing Automation Protocol (MAP) networks.

Mapstart is a hardware and software package said to let manufacturers simulate and test MAP-compatible systems with applications specific to their own operations. Users may also implement a MAP network in pilot applications on-line.

The hardware consists of a Honeywell WCC 1250 work center controller featuring up to 8M bytes of memory and programmable in either C or Cobol. It can handle 32 simultaneous I/Os for real-time, on-line control.

Mapstart costs approximately $176,000.

Honeywell, 2222 W. Peoria Ave., Phoenix, Ariz. 85029.

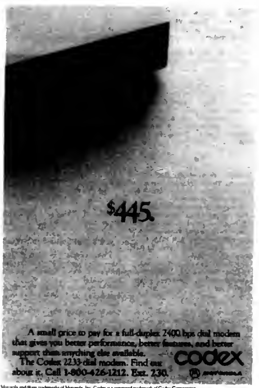
■

Pictel Corp. has annoucned **MCT-200**, a software package for its C-2000 Video Codec.

The software is said to boost the system's operating range to 168K bit/sec. The package employs proprietary compression technology, the vendor said. By operating at up to 168K bit/sec., MCT-200 is said to enable companies to create hybrid videoconferencing networks that contain both high-speed private transmission circuits and switched 56K bit/sec. networks.

The MCT-200 will be available in the fall as a plug-in cartridge for $9,500.

Pictel, One Intercontinental Way, Peabody, Mass. 01960.



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CW COMMUNICATIONS

Orion Software, Inc. has announced **Network Orion**, a set of integrated communications software programs designed for banking institutions using the IBM System/34, 36 and 38 computers.

The software is said to allow users to send messages into the International Telex network and access the international electronic mail networks. Banks can also integrate their application programs such as funds transfer, operational banking reports, letters of credit and end-of-day bank position reports with various networks and communications resources.

Network Orion costs $5,000 to $15,000 per site.

Orion Software, 1050 Waltham St., Lexington, Mass. 02173.

■

Frontier Software Development, Inc. has introduced **APAC**, a software package for automated and unattended control of Hewlett-Packard Co. protocol analyzers.

The APAC package is said to act as a master to one or more protocol analyzers operating as slaves. It combines real-time data gathering with number crunching and allows several tests to be linked together without user intervention.

Other features include the ability to share host resources and create statistical reports. It has autodial modem support, so analyzers can be located at remote sites.

APAC costs $1,995.

Frontier Software Development, 14 Livery Road, Chelmsford, Mass. 01824

■

Communications Solutions, Inc. has introduced **Disoss/Talk**, said to provide a user interface to IBM office automation products such as the Distributed Office Support System (Disoss).

Disoss/Talk was designed as an option to the vendor's Access/DIA package, a portable software emulation of IBM's Document Interchange Architecture. Disoss/Talk enables users to distribute documents to one or more recipients, retrieve documents that have been sent by other users and search libraries to retrieve selected files.

Disoss/Talk runs on a range of multitasking operating systems, including Unix and Microsoft Corp. MS-DOS. When bought with Access/DIA, it costs $10,000.

Communications Solutions, 992 S. Saratoga-Sunnyvale Road, San Jose, Calif. 95129.

Multiplexers/Modems

Eventide, Inc. has introduced the **Cloverleaf** multiplexer/spooler for Hewlett-Packard Co. HP-IB-based devices.

The Cloverleaf is said to buffer data from up to three computers, queue each job and parcel out the material sequentially to up to two peripherals.

According to the vendor, the Cloverleaf can buffer files to pen plotters.

The Cloverleaf is available in three configurations: with 256K bytes of memory, the price is $1,695; with 1M byte of memory, the cost is $2,495; and with 2M bytes of memory, Cloverleaf is available for $3,295.

Eventide, One Alsan Way, Little Ferry, N.J. 07643.

■

DEI-Teleproducts Division has announced the **Model 1010** and the **Model 1011**, asynchronous short-haul modems.

Both models are said to derive power from the RS-232C interface and to transmit data up to six miles at up to 9.6K bit/sec. and up to five miles at 19.2K bit/sec.

The modems come equipped with a six-ft line cord terminating with an RJ-11 modular telephone plug, the vendor said.

The modems cost $90 each.

DEI, 230 N. Market Place, Escondido, Calif. 92025.

Anderson Jacobson, Inc. has announced the **AJ 2412-AD3H**, an IBM Personal Computer AT-compatible 2,400 bit/sec. modem.

The modem is said to offer a full-featured memory dialer, programmable software options, an extended AT command set, callback and answerback security and multilevel password security.

The AJ 2412-AD3H is said to communicate over the switched telephone network. It handles synchronous or asynchronous data and eight- through 11-bit characters and interfaces with most communications software packages.

The modem is priced at $599.

Anderson Jacobson, 521 Charcot Ave., San Jose, Calif. 95131.

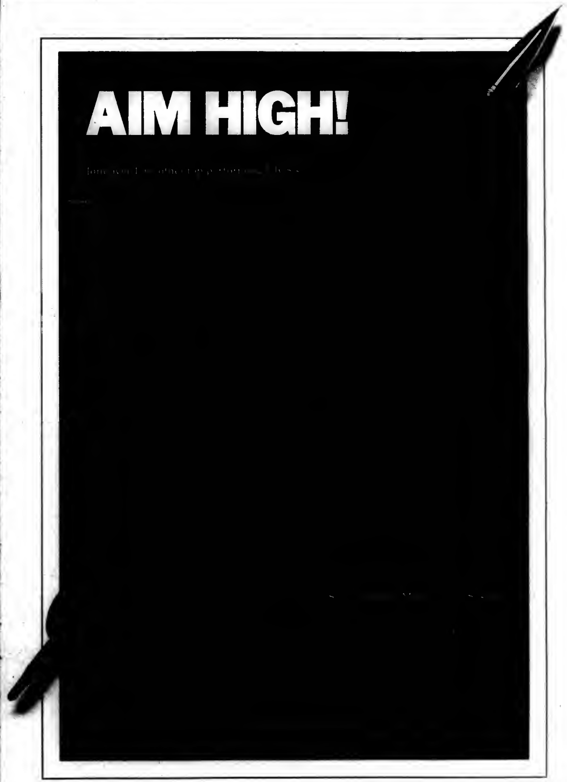
■

Cylink Corp. has announced the **CIDEC-LS** a Data Encryption Standard-based low-speed digital encryptor.

The CIDEC-LS operates in the full-duplex mode for synchronous communciations between 1,200 bit/sec. and 112K bit/sec. It supports the RS-232C, CCITT V.35 and RS-449 interfaces.

The encryptor is said to

Continued on page 104


AIM HIGH!
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Continued from page 102

implement a proprietary, automatic electronic key management system called Seek. According to the vendor, even the system operator never has access to the Seek encryption method.

The CIDEC-LS is priced at $2,500.

Cylink, 920 W. Fremont Ave., Sunnyvale, Calif. 94087.

■

Omnitel, Inc. has introduced the **Encore 2400 HB**, a 2,400 bit/sec. half-board integral modem.

The asynchronous modem, designed for use with the IBM Personal Computer, Personal Computer XT, AT and compatibles is said to be compatible with Hayes Microcomputer Products, Inc. products. It operates on the switched telephone network in full- or half-duplex operation at 300, 1,200 and 2,400 bit/sec.

Features include a speaker with software-controlled volume, call-progress reporting and automatic speed selection and fallback.

The Encore 2400 HB costs $399.

Omnitel, 5415 Randall Place, Fremont, Calif. 94538.

■

Comdesign, Inc. has introduced the **TC-1000 Unibus Concentrator** and the **TS-1000 Switching Multiplexer**, two asynchronous multipoint multiplexers said to provide remote connectivity for personal computers and terminals to Digital Equipment Corp. CPUs.

The TC-1000 is a single hex-width board that supports 64 simultaneous sessions. It emulates the asynchronous portion of eight DEC DMF-32 communications controllers.

The TS-1000 is capable of connecting terminals from as many as four remote sites. Up to 32 computer ports and terminal connections are supported at each site at speeds up to 9.6K bit/sec.

Pricing starts at $2,100 for the TS-1000. The TC-1000 costs $7,500.

Comdesign, 751 S. Kellogg Ave., Goleta, Calif. 93117.

■

Western Telematic, Inc. has introduced the **SM-21 Modem Security Unit**, designed to prevent unauthorized computer system access.

The unit allows users to set up security for incoming and outgoing calls. It connects to a computer's communications port and offers three levels of security using a 24-char. password and dial-back field of password only, number only or both password and number.

The SM-21 costs $495. With a built-in modem, it costs $695.

Western Telematic, 2435 S. Anne St., Santa Ana, Calif. 92704.

Local-area networks

SBE, Inc. has announced the **SBE-MLAN-11**, a plug-in Ethernet local-area network front-end processor for Intel Corp. Multibus systems.

The board is said to be able to handle gateway tasks linking local-area network and long-distance carriers. The board conforms to Ethernet IEEE 802.3 specifications.

According to the vendor, the board provides an effective Ethernet transfer rate of 10M bit/sec. Full-duplex direct memory access operation is provided through the serial/parallel and ISBX channels. Protocols supported include X.25, Synchronous Data Link Control, High-Level Data Link Control, bisynchronous and asynchronous.

In quantities of 100, the SBE-MLAN-11 costs $1,495.

SBE, 2400 Bisso Lane, Concord, Calif. 94520.

Network services

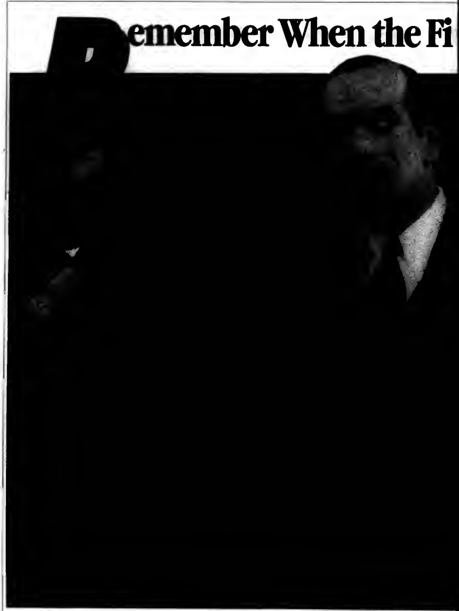
Timeplace, Inc. has announced that **Edvent II**, a data base containing descriptions of seminars and training programs, is available on the Compuserve, Inc. Information Service.

Users may select seminars by subject, state or date. Information about each event includes title, content summary, sponsor, location, date, duration and cost.

The data base is updated twice a month.

Access to the Compuserve Information Service is via personal computer, communications software and a modem.

In addition to the regular Compuserve connect rates, Edvent II costs $15 per hour, according to the vendor.



Timeplace, 460 Totten Pond Road, Waltham, Mass. 02154.

Test equipment

Mount Sinai Patient Care Control Systems has announced the **Response Time Monitor**, designed to pinpoint problem areas in a Burroughs Corp. communications network in graphic form.

The unit is said to measure the impact of operational procedures and program changes on system performance.

The Response Time Monitor operates on an IBM Personal Computer, Personal Computer XT or AT. It monitors traffic on a Burroughs poll-select asynchronous communications line and records the delay between transmission and receipt of message.

The Response Time Monitor costs $495.

Mount Sinai PCCS, Suite 406, 975 Arthur Godfrey Road, Miami Beach, Fla. 33140.

■

Atlantic Research Corp. has announced the **NTS 3000 Network Restoration, Test and Management System.**

The NTS 3000 is said to automatically monitor a network, restore service and access circuits with simple commands for troubleshooting.

It is composed of circuit alarms, A-B fallback and crossover switches, circuit access subsystems for testing, test equipment for troubleshooting, trouble tickets to document the problems and a data base management subsystem to summarize network activity.

A basic NTS 3000 configuration of 1,000 lines costs $190 per line.

Atlantic Research, 5390 Cherokee Ave., Alexandria, Va. 22312.

Atlantic Research Corp. has announced the **NTS 2000 Distributed Network Restoration and Test System.**

The NTS 2000 is said to restore service to remote data communications circuits from one location. Two configurations are offered, the LSC-2 system for CRT control of A-B fallback switches and the RCS-100 Remote Control Switch system for automatic reconfiguration, Touch-Tone or terminal control.

A basic NTS 2000 configuration of 1,000 lines is priced at $155 per line.

Atlantic Research, 5390 Cherokee Ave., Alexandria, Va. 22312.

SYSTEMS & PERIPHERALS

Turnkey systems

Syntrex, Inc. has introduced its **Concorde** family of 32-bit computers designed for the legal profession.

Continued on page 106

NEW PRODUCTS/SYSTEMS & PERIPHERALS

Continued from page 105

The Model 10 microcomputer has 2M bytes of memory and 67M bytes of hard disk storage. Models 30, 40 and 50 support up to 8M bytes of main memory, 16K bytes of bipolar cache memory and more than 1,800M bytes of data storage. The Model 60 has up to 16M bytes of main memory and 65K bytes of bipolar cache memory as well as more than 10,000M bytes of on-line data storage.

Prices start at $15,000.

Syntrex, P.O. Box 657, 246 Industrial Way W., Eatontown, N.J. 07724.

■

Phonetics, Inc. has introduced the **Sensaphone Computer Monitoring System**, designed to watch computer rooms, offices, laboratory facilities and any unattended property 24 hours a day.

The system warns users of environmental changes and alarm conditions.

If there is a problem, the Sensaphone Computer Monitoring System automatically calls up to four phone numbers and reports the alarm condition in English.

According to the vendor, the user can also call at anytime to check operating conditions.

Sensaphone Monitoring Systems are priced from $250 to $500.

Phonetics, 101 State Road, Media, Pa. 19063.

Processors

Ironics, Inc. has announced the **Performer 32/D** VMEbus Unix V.2 development/target system.

The multiuser system is based on two of the vendor's VMEbus boards. Features include memory management and floating-point coprocessor facilities as well as parallel and serial I/O interfaces.

Mass storage includes floppy disks, 80M-byte Winchester disks, removable cartridge tapes and optional 9-track tape.

A C-compiler and Motorola, Inc. 68000 assembler are provided with all Unix systems.

Prices start at $17,335.

Ironics, 798 Cascadilla St., Ithaca, N.Y. 14850.

Graphics Systems

Graphon Corp. has added the **GO-235** to its GO-200 series of composite terminals.

According to the vendor, the GO-235 offers 1,024- by 780-pixel resolution and 60 Hz noninterlaced video.

It features graphics emulation of the Tektronix, Inc. 4010 through 4015 graphics devices and alphanumeric emulation of the Digital Equipment Corp. VT220 and VT100.

The GO-235 is said to write up to 52 lines of text to the 80 by 132-col. screen in alpha mode.

The GO-235 costs $1,695.

Graphon, 5th Floor, Tower One, 1901 S. Bascom Ave., Campbell, Calif. 95008.

■

TAT Graphics Group, Inc. has announced the **Galaxy EGX2**, a graphics display controller said to provide 800- by 600-pixel resolution.

The Galaxy board offers a multiplexing feature. It can display separately either IBM Enhanced Graphics Adapter board output at 640 by 350 pixels or Color Graphics Adapter output at 640 by 200 pixels monochrome and 320 by 200 pixels color.

The board comes with the Galaxy ADI driver for Autodesk Corp.'s Autocad. It is also available combined with the Digital Equipment Corp. Multisync monitor as the Sextant 814S display system.

The EGX2 graphics board costs $1,195. The Sextant 814S costs $1,995.

TAT Graphics Group, Building E, 1270 Lawrence Station Road, Sunnyvale, Calif. 94089.

■

Seiko Instruments U.S.A., Inc. has announced the **Screenplay digitizing tablet.**

According to the vendor, the tablet is plug compatible with the Summagraphics Corp. Bit Pad Two. Screenplay is an 11-in. by 11-in. tablet featuring sampling rates up to 200 point/in. and resolution up to 1,000 line/in.

Screenplay reportedly supports three input device types: a four-button cursor, a mouse-like three-button cursor and a one-button stylus pen.

Seiko Instruments said that built-in diagnostic functions include power-on confidence test, on-line self-test and loop-back self test.

Screenplay is priced at

Continued on page 108

NEW PRODUCTS/SYSTEMS & PERIPHERALS

Continued from page 106

$495.

Seiko Instruments U.S.A., 1623 Buckeye Drive, Milpitas, Calif. 95035.

■

AMF Logic Sciences, Inc. has introduced the **Turbograph 2100**, a high-speed processor for recording computer-generated images on color slide or print film.

According to the vendor, the vector-to-raster processor can accept graphics data from a variety of host computer systems, including PCs.

It is compatible with industry standard graphics command languages or Hewlett-Packard Co.'s Graphics Language.

An image is transferred to the Turbograph 2100 via an RS-232C serial data link. The digital controller converts the image to a 2,048- by 2,048-pixel raster format and passes it on to a digital film recorder.

The Turbograph 2100 costs $7,995.

AMF Logic Sciences, 10808 Fallstone Road, Houston, Texas 77099.

■

Westward Technology, Inc. has announced the **Model 2315** graphics terminal and the **Model 2216** color desktop graphics terminal.

The 2315 features a 15-in., full square tube display with 1,024- by 784-pixel resolution, two independent graphics planes and Digital Equipment Corp. VT100 compatibility. It also includes 512K bytes of display-list memory.

The 2216 provides 640- by 490-pixel resolution, 16 simultaneous colors and serial line speed to 38.4K bit/sec. It also has a 15-in., full square tube display, DEC VT100 and VT220 emulation and Tektronix, Inc. 4105 compatibility.

Both terminals are priced at $4,995.

Westward Technology, 63 Great Road, Maynard, Mass. 01754.

■

Greyhawk Systems, Inc. has announced **Softplot 2122**, a 5-ft high graphics display device.

Softplot 2122 is said to display full-color D-size drawings. A black or white background can be selected.

It features a 16-level gray scale and lines that can be drawn at widths ranging from 10mm to 50mm in a single pass. There are 120 million addressable points.

According to the vendor, the Softplot 2122 connects to existing computer-aided design and manufacturing networks and emulates software plotting standards such as Hewlett-Packard Co.'s Graphic Language, Calcomp Co.'s 906/907 and Versatec, Inc.

Softplot 2122 is priced at $46,176.

Greyhawk Systems 1557 Centre Pointe Drive, Milpitas, Calif. 95035.

■

Versatec, Inc. has announced **Acris II**, the Model 950 aperture card raster input scanner, as a replacement for its Acris I.

Acris II is said to offer users fine line detection capability as well as output resolution settings to accommodate the vendor's electrostatic plotters. It includes selectable variable windowing that provides users with the capability to define their own custom-image window size and magnification level.

Acris II is priced at $16,750.

Versatec, 2710 Walsh Ave., Santa Clara, Calif. 95051.

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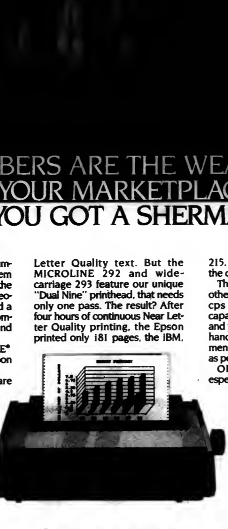

The 292 and 293 are winners in other ways, too, with speeds of 200 cps in the Utility mode. Color capability for impressive reports and presentations. Versatile paper handling. And a feature selection menu that's as easy to order from as pointing a finger.

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NEW PRODUCTS/SYSTEMS & PERIPHERALS

Data storage

Cambex Corp. has introduced the **Cambex Certainty 250 series**, a disk storage system for IBM Series/1 users.

The series is available in 200M-byte increments that can be expanded up to 800M bytes per system. The system comes with an on-board cache memory of 512K bytes.

According to the vendor, users can mount up to two disks in the standard IBM 4967 mounting space. The disk storage system is said to be IBM 4967 software compatible.

The Certainty 250 series is priced at $20,000.

Cambex, 360 Second Ave., Waltham, Mass. 02154.

■

Storage Concepts, Inc. has announced the **MV21** parallel transfer disk storage system for use with Digital Equipment Corp.'s Microvax II.

According to the vendor, the MV21 offers a sustained transfer rate of more than 8M bit/sec. It also provides a high-speed port for up to 9.3M bit/sec. data transfers.

The MV21 is composed of a rack-mountable disk processor, a single quad-height board assembly, a parallel transfer disk and a device driver for the MicroVMS operating system. It has five parallel channels.

A complete system is priced at $42,400. The Microvax device driver is priced at $2,000.

Storage Concepts, 3198-G Airport Loop Drive, Costa Mesa, Calif. 92626.

■

NCR Corp. has announced the **ADP-53**, a small computer systems interface (SCSI) to ½-in. Pertec Peripherals Corp. tape controllers.

The unit was designed to control up to four streaming tape drives using the industry-standard Pertec tape interface. It supports multiple tape speeds and densities as well as data formats.

Features include an SCSI copy function, a 64K-byte intelligent buffer memory with parity, sequential tape I/O and standard SCSI initiator and target roles.

The single-ended board is priced at $1,100.

NCR Corp., 3718 N. Rock Road, Wichita, Kan. 67226.

Printers/Plotters

Versatec, Inc. has announced the **Model 250 RGB Video Controller**, said to produce hard copy in color or monchrome from digital video sources.

The controller is said to allow video images to be output as hard copy on Versatec printers and plotters. It can capture color images from any screen resolution up to 1,280 by 1,024 pixels. It has a selectable pixel expansion feature and an image-rotate option.

The RGB Video Controller is priced at $2,500.

Versatec, 2710 Walsh Ave., Santa Clara, Calif. 95051.

■

Polaroid Corp. has introduced the **Chromajet 4000** ink jet printer, manufactured by Advanced Color Technology, Inc.

The printer offers four colors that can be combined for a palette of 1,000 color shades with resolutions up to 300 dot/in. Text can be printed in seven colors using bold, italic, double-width or condensed type styles.

Letter print mode operates at 27 char./sec. and 360 by 144 dot/in., and draft mode at 100 char./sec. and 120 by 72 dot/in.

The Chromajet 4000 will be available in the third quarter of this year for prices ranging from $2,000 to $3,000.

Polaroid, 575 Technology Sq., Cambridge, Mass. 02139.

■

General Business Technology, Inc. has introduced the **GBT 6640XP** ion printer for the IBM System/34, 36 and 38.

The nonimpact printer has a print speed of 30 page/min and a resolution of 300 by 300 dot/in. It uses standard letter 8½- by 11-in. or legal 8½- by 14-in. paper.

Dual input feeders hold up to 500 sheets each. User features include program- and operator-selectable page orientation, font, lines per inch, characters per line, copies and I/O feeder.

The GBT 6640 ion printer costs $14,995.

General Business Technology, 1891 McGraw Ave., Irvine, Calif. 92714.

NEW PRODUCTS/SYSTEMS & PERIPHERALS

Tektronix, Inc. has introduced the **4696 Color Inkjet Printer**, a desktop personal printer.

The printer features addressability of 120 dot/in. It offers four inks and can produce output on paper and transparency media.

Two system configurations are available. The 4696S Color Graphics Output System combines the 4696 and the 4510 Color Graphics Rasterizer. It is host-based and performs as a shared plotting resource off ASCII-based computers.

The IBM-compatible CX4696S Color Graphics Output System is priced at $8,995.

The 4696 is priced at $1,795, the 4696S costs $6,995, and the CX4696S costs $8,995.

Tektronix, P.O. Box 1700, Beaverton, Ore. 97075.

Auxiliary equipment

Dataproducts Supplies Division has announced the **Centronics 350** nylon cartridge ribbon and the **Burroughs 9246/Hitachi wide-ribbon** printer ribbons, said to be compatible with printers from Centronics Data Computer Corp., Burroughs Corp. and Hitachi Ltd.

The Centronics 350 ribbon is priced at $107 per six-pack. The Burroughs 9246/Hitachi ribbons cost $34 each for the 0.005 width ribbon and $36 each for the 0.004 width ribbon.

Dataproducts Supplies Division, Suite 310, 15250 Ventura Bivd., Sherman Oaks, Calif. 91403.

■

Allied Electronic Services, Inc. has introduced the **Tempo RTM Coax**, a response time monitor (RTM) for use with IBM's 3179 and 3180, ITT Courier and most IBM terminal look-alikes.

The RTM Coax is said to interface with most terminals using coaxial cables or an IBM 3274 controller. It records each transaction and compiles the daily information into a statistical data base. It is portable and provides software identification.

The Tempo RTM Coax is priced at $3,295. The pollable model, for use in remote sites, costs $3,495.

Allied Elecronic Services, P.O. Box 819, Stonybrook Road, Lebanon, N.H. 03766.

PRICE REDUCTIONS

On-Line Software International, Inc. has reduced the prices of its **Omnilink/34**, **Executrieve/34** and **Data Entry/34** software products for the IBM System/34.

Omnilink/34 is a System/34-to-personal computer file transfer software link. It now costs $1,000. The file reformatting utility costs $200 per copy, $185 per copy for up to 10 copies and $160 per copy for more than 10 copies.

Executrieve/34 is a data management package for retrieval, ad-hoc query, report writing and graphics. It costs $1,500.

Data Entry/34 is an application tool for use with Executrieve/34 and is said to give users the ability to design single-screen applications for data entry and storage. It costs $500.

On-Line Software, Two Executive Drive, Fort Lee Executive Park, Fort Lee, N.J. 07024.

■

Verticom, Inc. has announced price cuts on its **VG series** of Tektronix, Inc. terminal emulation packages.

The packages allow the IBM Personal Computer family and compatibles to take the place of Tektronix 4107 and 4109 devices. The packages incorporate Grafpoint's Tgraf-07 software and Verticom's graphics controller.

The new prices are as follows: VG-07, $3,495; VG-07A, $5,995; VG-09, $2,795; and VG-09A, $2,695.

Verticom, 545 Weddell Center, Sunnyvale, Calif. 94089.

■

Independent Business Systems, Inc. has announced price reductions on its 16-bit multiuser **Ultraframe** computer systems.

Ultraframe systems support from two to 32 users. They are available in configurations of hard and floppy drives as well as tape backup systems.

Prices now start at $6,995. A typical 16-user system with a 74M-byte hard disk now costs $24,235.

Independent Business Systems, 5915 Graham Court, Livermore, Calif. 94550.

CALENDAR

WEEK OF JUNE 8

JUNE 8-11, NEW ORLEANS — **Ethernet Decision-Makers Group Exchange Conference.** Contact: EDGE International, Inc., Suite 260, 1539 N. China Lake Blvd., Ridgecrest, Calif. 93555.

JUNE 8-11, TORONTO — **World Computing Services Industry Congress V.** Contact: Co-Ordination Plus, Inc., Suite 2102, 65 Queen Street W., Toronto, Ont., Canada M5H 2M8.

JUNE 9-10, TEANECK, N.J. — **Machover on Business Graphics.** Contact: Carol Every, Industry Representative, Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

JUNE 9-11, MYRTLE BEACH, S.C. — **The Association of Small Computer Users in Education 19th Annual Summer Conference.** Contact: Jack Cundiff, Horry-Georgetown Technical College, Conway, S.C. 29526.

JUNE 9-11, NORCROSS, GA. — **Time and Motion Study Fundamentals.** Contact: Institute of Industrial Engineers Registrar, 25 Technology Park/Atlanta, Norcross, Ga. 30092.

JUNE 9-12, BOSTON — **Network Management/Technical Control Conference and Exposition.** Contact: CW/Conference Management Group, 375 Cochituate Road, Framingham, Mass. 01701.

JUNE 9-12, CHICAGO — **Com Lease Spring, The Computer Leasing Conference and Expo.** Contact: Show Management Offices, 3825-1 S. George Mason Drive, Falls Church, Va. 22041.

JUNE 9-13, SAN DIEGO — **MUMPS Users' Group 15th Annual Meeting.** Contact: MUMPS Users' Group, Suite 510, 4321 Hartwick Road, College Park, Md. 20740.

JUNE 11, NEW YORK — **The Semiconductor Industry — Its Changing Structure 1986.** Contact: Robert Burton, L. F. Rothschild, Unterberg Towbin, 55 Water St., New York, N.Y. 10041.

JUNE 11-13, MAINZ, WEST GERMANY — **International Tandem Users' Group 1986 Spring Conference.** Contact: ITUG Headquarters, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

JUNE 11-13, TEANECK, N.J. — **Machover on CAD/CAM.** Contact: Carol Every, Industry Representative, Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

JUNE 13, DETROIT — **James Martin Seminar — The End-User Revolution.** Contact: Thomas J. Bisacquino, Director of Education, Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

WEEK OF JUNE 15

JUNE 15-20, LONG BEACH, CALIF. — **1986 Government Management Information Sciences Conference.** Contact: Tom Lang, Assistant Chairman, Data Processing Department, 9150 E. Imperial Highway, Downey, Calif. 90242.

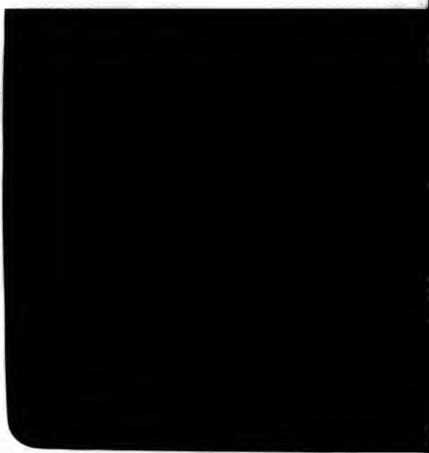
JUNE 16-18, UNIVERSAL CITY, CALIF. — **Synergy '86, Conference on Functional Interfacing for Computer-Integrated Manufacturing.** Contact: Cheri Willetts, Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

JUNE 16-19, LAS VEGAS — **The 1986 National Computer Conference.** Contact: National Computer Conference, 1899 Preston White Drive, Reston, Va. 22091.

JUNE 16-20, CAMBRIDGE, MASS. — **Managing Information Technology: New Responsibilities in a Changing Environment.** Contact: Center for Information Systems Research, Sloan School of Management, MIT, E40-193, 77 Massachusetts Ave., Cambridge, Mass. 02139.

JUNE 17-18, PLYMOUTH, MICH. — **Robotic End Effectors: Design and Applications Seminar.** Contact: Mary Dombrowski, Special Programs Division, Robotics International of the Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

JUNE 17-19, ATLANTIC CITY — **Plas-Tech '86.** Contact: Delia Associates, P.O. Box 338, Delia Marketing Communications Center, Whitehouse, N.J. 08888.



NEWS

JUNE 18-20, TOKYO — **Marketing Opportunities Seminar.** Contact: Agnes M. Pavel, Program Director, U.S. Telecommunications Suppliers Association, Suite 1618, 333 N. Michigan Ave., Chicago, Ill. 60601.

WEEK OF JUNE 22

JUNE 22-27, PHILADELPHIA — **Management Information Systems for Strategic Advantage.** Contact: The Registrar, Office of Executive Education, 200 Vance Hall, The Wharton School of the University of Pennsylvania, Philadelphia, Pa. 19104.

JUNE 23-25, ALBUQUERQUE, N.M. — **Integrated Fiber-Optic Technology Training.** Contact: Linda Castle, Optoelectronic System Consultants, P.O. Box 35525, Albuquerque, N.M. 87176.

JUNE 23-25, MIAMI — **Electronic Data Processing Auditors Association 14th Annual International Conference.** Contact: EDPAA, P.O. Box 88180, Carol Stream, Ill. 60188.

JUNE 23-26, BOSTON — **ATE East '86.** Contact: Registrar, Morgan-Grampian Expositions Group, 1050 Commonwealth Ave., Boston, Mass. 02215.

JUNE 23-27, AMSTERDAM — **Fourth Annual European Fiber-Optic Communications and Local-Area Networks Exposition.** Contact: Information Gatekeepers, 214 Harvard Ave., Boston, Mass. 02134.

JUNE 23-27, CHICAGO — **A/E/C Systems '86: The Computer and Management Show for the Design and Construction Industry.** Contact: Conference Director, A/E/C Systems '86, P.O. Box 11318, Newington, Conn. 06111.

JUNE 24-26, CHICAGO — **Structured Techniques Association III/Structured Techniques in the Eighties: Practice and Prospects.** Contact: Heller Financial Corp., 105 W. Adams St., Chicago, Ill. 60603.

JUNE 24-27, CHICAGO — **Autocad Expo '86.** Contact: William Ryan, Autocad Expo '86, Autodesk, Inc., 2320 Marinship Way, Sausalito, Calif. 94965.

JUNE 25, CHICAGO — **International Facility Management Association's Computer Applications for Facility Management.** Contact: IFMA, Suite 1410, 11 Greenway Plaza, Houston, Texas 77046.

WEEK OF JUNE 29

JULY 2-3, LAS VEGAS — **Full Meeting of the Design Automation Standards Subcommittee.** Contact: Ron Waxman, Design Automation Standards Subcommitee Co-Chairman, IBM FSD, 9500 Godwin Drive, Manassas, Va. 22110.

WEEK OF JULY 6

JULY 9-11, NEW YORK — **The Fourth Annual PC Expo.** Contact: PC Expo, P.O. Box 1026, Englewood Cliffs, N.J. 07632.

WEEK OF JULY 13

JULY 13-18, CHICAGO — **Guide 65.** Contact: Guide International Corp., 111 E. Wacker Drive, Chicago, Ill. 60601.

WEEK OF JULY 20

JULY 23-25, BOSTON — **Microtrends '86, Education: Redirecting the Revolution.** Contact: International Communications Industries Association, 3150 Spring St., Fairfax, Va. 22031.

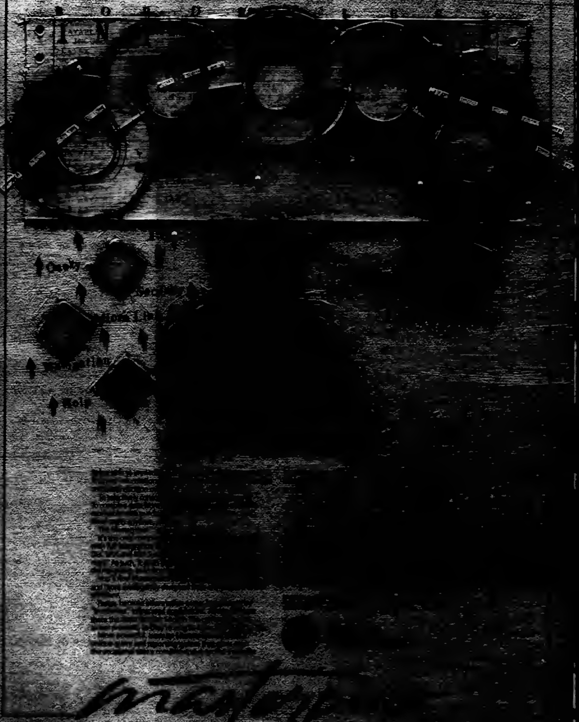
WEEK OF JULY 27

JULY 27-31, ANAHEIM, CALIF. — **Third Annual Information Center Conference & Exposition.** Contact: Information Center Conference & Exposition, Weingarten Publications, Inc., 38 Chauncy St., Boston, Mass. 02111.

JULY 28-30, RENO, NEV. — **1986 Summer Computer Simulation Conference.** Contact: The Society for Computer Simulation, P.O. Box 17900, San Diego, Calif. 92117.

WEEK OF AUG. 3

AUGUST 4-8, ANN ARBOR, MICH. — **Contemporary Data Communication Networks: Planning, Management and Computer-Based Design.** Contact: Engineering Summer Conferences, 300 Chrysler Center/N. Campus, Ann Arbor, Mich. 48109.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Section begins on page 150

DCA seeks more acquisitions to maintain market status

Anticipates rise of LAN, gateway technologies

By James A. Martin

ALPHARETTA, Ga. — The direction of the market dominated by Digital Communications Associates, Inc. (DCA) is expected to shift dramatically in the next few years. To stay on top, DCA is depending on both internal development and more acquisitions within the data communications market.

Although terminal emulation boards, such as DCA's trademark Irma, are expected to almost double in sales this year compared witb last year, analysts are predicting that that method of linking micro to host will eventually be replaced by the more sophisticated local-area network (LAN) and gateway products.

For DCA, then, the key to maintaining its status as market leader is to continue its market focus but also to "expand horizons" within that focus, according to President and Chief Executive Officer Bertil D. Nordin.

Nordin confirmed in a recent interview that DCA seeks to acquire at least one additional data communications company this summer, probably in California or Georgia. DCA now has a strong presence in Silicon Valley after its merger earlier this year with the San Jose, Calif.-based micro-to-mainframe vendor Forte Communications, Inc.

Without specifying potential acquisitions, Nordin says the next logical step for DCA would be in the realm of LAN, gateway and T1 multiplexer products. Those areas, Nordin says, "will be very significant, and we will be in those businesses in a significant way. But it's hard to tell how fast users will embrace LAN technology, for example, when it's still a whole lot easier to use boards and coax cable."

Bertil Nordin

"DCA is not completely wedded to any particular technology," says analyst Mark Dunkel, vice-president of research for Robinson-Humphrey Co. in Atlanta. "Instead, they are wedded to their marketplace. I don't see the end of Irma anytime soon. However, DCA is aware of the fact there are competing technologies and is searching to acquire those products and companies that will give it those technologies."

DCA must plan for the technology emerging from its main competitor in the terminal emulation market, IBM. The LU6.2 communications protocol, for example, "is certainly going to have a profound impact on the market, as it gives the best of both worlds, allowing PC-to-PC and PC-to-host transactions," Nordin says.

Both LU6.2 and IBM's Token-Ring architecture are expected to become standards, and DCA is planning to develop products with those standards in mind. "I can't comment on how successful IBM's Token-Ring will be, but IBM's market impact is very significant, and we have to assume the Token-Ring will become dominant as a result," Nordin says.

In addition, DCA hopes to gain a stronger position in the emerging T1 market, with future enhancements of its high-speed multiplexer known as Netlink to include an interface with the Integrated Services Digital Network.

DCA was founded in 1972 and is credited with introducing the first commercially available statistical multiplexer. In 1983, the company acquired Technical Analysis Corp. (TAC) of Atlanta, the developer of the Irma technology, now DCA's flagship product line.

DCA has weathered the computer industry downslide remarkably well. In the third quarter ended March 31, DCA's sales were $36 million, up from $23 million the previous year. Income was $5.8 million, compared with $2.7 million. Sales and profits have risen steadily over the past five years. In fiscal 1985, ended last June, DCA reported sales of $83.7 million, compared with $51 million for fiscal 1984. Net income was $10.5 million, up from $6.7 million.

Forte is to become fully integrated under DCA's personal computer communications group, with Forte's president, Jim Ottinger, as head of that group.

Forte products will continue to be sold under their name.

"The Forte acquisition gives DCA a number of things it didn't have in the past," says Dunkel. "It increases their market share dramatically to about 60%, as Forte was the third-largest producer of communications boards behind IBM and DCA. Forte brings technological capabilities in graphics as well as the ability to support the LU6.2 protocol and Systems Network Architecture."

"We want to be a full-line data communications supplier, and there are certain parts of our product line we need to fill out in order to do that," Nordin said.

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Justice approves GE's takeover plan for RCA

WASHINGTON, D.C. — After five months of deliberation, the U.S. Justice Department recently approved General Electric Co.'s plan to take over RCA Corp. for $6.46 billion.

The antitrust clearance calls for slight modification of GE's plan, to which GE has agreed, signaling the beginning of the largest non-oil company merger in history. The merger could be completed by the end of this month, analysts say. The combined income of the potential merger could be higher than $40 billion per year.

IBM OKs stock buyback

By Clinton Wilder

ARMONK, N.Y. — IBM last week announced its first corporate stock purchase plan in eight years, authorizing a buyback of up to 10 million shares, or 2% of shares outstanding.

The company said the move reflects its belief that its shares are a good investment at current price levels.

Analysts said they felt that IBM is trying to boost its stock price. IBM's stock has lagged behind the current bull market, reflecting the company's sluggish first-quarter earnings and cautious outlook for the balance of the year.

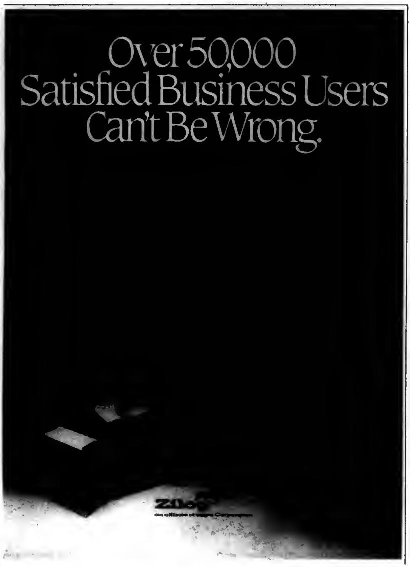
IBM stock was trading last week in the $145- to $147-per-share range, down from its 52-week high near $162.

The program authorizes IBM to spend up to approximately $1.47 billion in cash for stock repurchase purposes.

IBM has developed a strong cash position despite its slower earnings growth, and it held $6.73 billion in cash and securities at the end of its first quarter March 31.

IBM also has an ongoing stock purchase plan to acquire shares for use in its employee and shareholder stock-option plans, according to company officials.

The company purchased approximately 12.8 million of its shares under that plan in 1984 and 1985.



Bandwagons give a shaky ride

From page 150

bursting during its rapid rise in the '60s and '70s, suddenly had lots of empty seats. Many of those riders hopped onto the fast-moving DG and Wang bandwagons or chose to squeeze onto the ever-crowded Big Blue coach. Bandwagon riders unabashedly hitch their fortunes to a rising star.

While DEC descended, DG and Wang took flight. The consultants and computer press gushed about DG's beautifully conceived office strategy and lauded its landing of several multimillion-dollar accounts. They crowed loudly about Wang's willingness to open its architectures in order to preserve annual growth figures that rivaled Imelda Marcos' shoe budget.

But bandwagons have a funny way of collapsing under their own weight. In just a couple of years, the headlines have changed dramatically. Suddenly, DEC is everyone's darling while the gates of Wang are burning. DG just quietly disappeared.

Computer Industry section begins on page 150.

Other vendors know the phenomenon just as well. Where are all the Apple polishers of yore, and why are people now saying all those bad things about Lotus Development Corp., Cullinet Software, Inc. and AT&T? Even IBM feels the sting of desertion in a down market.

Make no mistake. The players generally deserve the bandwagon riders, because they themselves struck up the band. If the road to glory is built upon false hopes and empty catch phrases, then flat tires are inevitable.

But more often, the true picture takes a lot longer to develop. Short-term problems, as in DEC's case, can give way to long-term promise. One company may react to an industry-wide slump better than another, but that may not spell doom or Chapter 11. High fliers may need to operate at lower altitudes, but that does not portend a crash.

The companies themselves are not the ones most affected by bandwagons, anyway. It is the users who face the toughest challenge in distinguishing between momentary lust and true long-term affection.

How must MIS directors feel today after purchasing $1 million worth of equipment from yesterday's superstar? Should they feel abandoned by the consultants, analysts and writers they believed three years ago?

The enlightened user will have to look beyond the thundering bandwagon to find the answers. A bad fiscal quarter is no more reason to abandon a vendor's equipment than a good one is to buy from a vendor. It is incumbent upon MIS departments to check out long-term strategies, product lines and compatibility issues before pledging allegiance.

Though morale may currently be low in some vendors' boardrooms and the New England Patriots' locker room, good seasons may still lie ahead.

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IBM OSI-based network predicted first on European mart

Early bird efforts aim to unite Big Blue's systems

By Edward Warner
Computerworld News Service

AMSTERDAM — IBM will be the first firm on the European market with an International Standards Organization's Open Systems Interconnect (OSI)-based network, a telecommunications industry analyst predicted at Eurocomm '86, a communications trade show held recently.

IBM will use OSI, which allows machines from different vendors to communicate, as the means to tie together all of its incompatible computers, according to Rudolf Strobl, a senior consultant with Software Research Corp., a Natick, Mass.-based firm that tests software for compatibility with industry standards. "The name of the game is openness — so IBM can sell more of its own computers," Strobl said at the conference.

Although he could not say when IBM would unveil a full implementation of OSI as an alternative to Systems Network Architecture, Strobl reported IBM has been showing selected customers an implementation of OSI, completed up to Levels 4 and 5 of the seven-layer OSI architecture.

By becoming the first to fully implement the OSI architecture, Strobl said IBM will beat European vendors to the OSI market and solidify its position in Europe where OSI compatibility is becoming a hot issue and where IBM derives about 25% of its revenue.

A group of 12 European vendors — including Siemens AG, N.V. Philips, Olivetti SPA, Nixdorf Computer AG and International Computers, Ltd. — has been working since 1983 to produce an implementation of all layers of OSI, but they are currently stymied by problems at the two uppermost layers, said R. W. Sutton, an assistant technical director for the UK's General Electric Co.

These problems will keep the group of European computer vendors, known as the Standards Promotion and Applications Group, from achieving its goal before IBM, Strobl claimed.

In the U.S., a group of computer vendors came together late last year to form the Corporation for Open Systems (COS), a nonprofit group that would develop an OSI implementation and certify compliance with it. COS membership now boasts more than 40 vendors — including IBM — and the organization's war chest totals hundreds of thousands of dollars in membership fees.

Based on the interest in OSI shown by its competitors, IBM has rightfully decided OSI represents a major market opportunity and is pursuing OSI research on its own, Strobl said.

By beating its competitors to the market with full OSI implementation, IBM will be able to build special functions into the upper levels that only IBM users will be able to receive, although the specification will be available to its competitors.

IBM selected as world distributor of Autodesk tools

SAUSALITO, Calif. — Autodesk, Inc. recently announced that IBM has acquired exclusive rights to distribute three Autodesk software products outside the U.S. for use with the IBM Japan Personal Computer, Models 5540, 5500 and 5560. IBM Japan will distribute the products in Japan, China, Southeast Asia and Australia.

The Autodesk products are Autocad drafting software in Japanese and other language versions; CAD-/camera, a scanning package that converts paper drawings to Autocad drawings; and Archicadd, a program that customizes Autocad for use in an architectural engineering environments.

IBM Japan demonstrated the Autodesk products at the Japan Business show in Tokyo recently

Firms sign ISDN R&D agreement

ATLANTA — The concept of a worldwide integrated communications network may have moved a step closer to reality recently with a research agreement between Northern Telecom, Inc. and Motorola, Inc.

The companies will collaborate on research and development of a new family of semiconductor components for use in the Integrated Services Digital Network (ISDN).

Northern Telecom will reportedly provide Motorola with network and system architectures, semiconductor device specifications and ISDN testing and evaluation results. Motorola will bring to the project design expertise in advanced semiconductor technology suitable for low-cost, high-volume manufacturing.

Bell Atlantic helps Sorbus

From page 150

company that leases all types of products, including airplanes," Ross notes.

Ross, who joined Sorbus last September after a 31-year career with IBM, hopes the broader exposure will enable the $190 million firm to grab a larger chunk of the $1.4 billion third-party maintenance market. The market is expected to grow about 12% this year, according to International Data Corp. (IDC) of Framingham, Mass.

"Sorbus is growing as fast as the third-party maintenance market and has the second-largest market share in 1985, with about 12.9%," says IDC's Rebecca Segal. Bell Atlantic does not report Sorbus revenue separately, but IDC estimates that Sorbus grew 19% from $160 million to $190 million last year.

While sluggish sales of computer-related equipment in the past 18 months have wreaked havoc on suppliers, the slowdown has not hampered third-party maintenance companies like Sorbus, Ross claims. He notes that enhanced maintenance enables corporations to retain existing equipment, instead of purchasing more costly gear.

Yet since the third-party maintenance business is inextricably tied to the computer industry, a prolonged downturn could eventually affect Sorbus. "Our business depends on the availability of more and more products to service," he says.

The third-party maintenance business continues to attract additional competitors, especially computer manufacturers looking for a way to offset shrinking hardware profit margins. Firms like Sperry Corp., NCR Corp. and Honeywell, Inc. are finding the higher profit margins of the third-party maintenance industry a significant attraction during the current industry slowdown, analysts say.

"It's easier to say who isn't in the third-party business as opposed to saying who is," suggests D. R. MacNaughton, president of Business Development International, a Franklin Lakes, N.J., firm that tracks the maintenance industry.

But Ross contends that Sorbus has not seen much competition from the computer manufacturers yet. "If you peel back the veneer and look very carefully, it appears that these companies are not going to eat their own children by servicing a competitor's product," he explains. "Most would never give 360 degrees of total service anyway. They see it as a way of enhancing product sales."

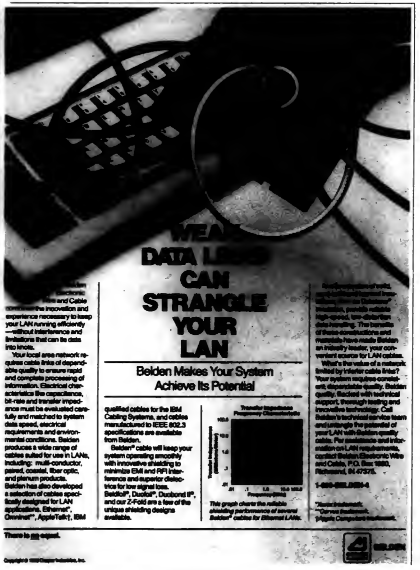
Spare parts availability

An issue more troubling to Ross is the lack of spare parts support provided by some computer vendors [CW, Oct. 21, 1985]. Only IBM, by virtue of a 1956 U.S. Department of Justice consent decree, is required to supply spare parts to the third-party industry, but other vendors are ostensibly free to do as they please.

"Theoretically, though, OEMs have to sell parts to customers," Ross says. "If these customers contract with a service company that can't service their equipment because they can't get parts, it doesn't reflect well on the manufacturer."

Sorbus, whose Greek name refers to a strong, multibranch tree that bears edible fruit, is branching out into a variety of new businesses. It has recently begun servicing disk drives on personal computers and is pushing into multivendor environments. The firm has also recently joined archrival TRW by entering the so-called fourth-party maintenance business of refurbishing used equipment for computer lessors and other service companies.

To remain successful, Sorbus will be sticking to its knitting: servicing end users of IBM and compatible products as well as those of its former sibling company Basic Four. "The key to this business is quality. You can't just promise it; you have to deliver it," Ross concludes.



Bill said to aid U.S. high tech

From page 150

mandated retaliation can keep the pressure on other countries to open their markets to U.S. firms," said James J. Florio (D-N.J.).

In other provisions related to the computer industry, the bill would provide the following:

- Strengthen procedures under Section 301 of the Trade Reform Act of 1974 and require the president to retaliate against certain foreign trading practices within strict time limits.
- Add "export targeting" to the list of unfair trading practices that require retaliation. This would cover the kind of preferential treatment that Japan and Brazil give to their computer industries, according to legislators.
- Support the U.S. semiconductor industry's complaints against Japanese manufacturers as specified by an amendment that passed by a 408-5 vote.
- Require countries with excessive trade surpluses to reduce them by 10% per year or face U.S. penalties. Critics said this highly controversial provision, which would affect Japan, Taiwan and West Germany, will invite retaliation against U.S. exports.
- Require a 40% reduction in the number of products on the export-control list, which regulates technology exports that could be used by the military of Soviet-bloc countries.

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✓dBase III Plus 1.0	call
✓Framework II 1.0	call
Best Programs *(not copy-protected)*	
✓PC/Tax Cut *(1986 version for 1985 taxes)*	119
✓PC/Fixed Asset System 3.1	299
Bible Research *(not copy-protected)*	
✓THE WORD 3.1 *(KJV Bible)*	159
✓THE WORD 3.1 *(NIV Bible)*	159
Borland International *(not copy-protected)*	
✓Turbo Tutor 1.0	19.
✓Turbo Database Toolbox 1.2	33.
✓Turbo Graphix Toolbox 1.0	33
✓Turbo Editor Toolbox 1.0	41
✓Turbo Gameworks 1.0	37
✓Turbo Newpak *(Gameworks and Editor)*	52
✓Turbo Lightning	57.
✓Sidekick 1.5	49
✓Traveling Sidekick *(req. Sidekick)*	45.
✓Traveling Sidekick w/Sidekick	73.
✓Reflex 1.1	59.
✓Superkey 1.1	41.
✓Superkey/Sidekick Package	67
✓Turbo Pascal 3.0	41.
✓Turbo Prolog 1.0	65
✓Turbo Holiday Pack *(Pascal 3.0, Tutor, and Database Toolbox)*	67.
✓Turbo Family Jumbo Pack *(Pascal 3.0, Database, Editor & Graphix Toolboxes, Tutor and Gameworks)*	135.
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✓Graphics Library 1	22.
✓Print Shop	35
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Infocom *(not copy-protected)*	
✓Cornerstone 6.1	65.
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Living Videotext	
✓ThinkTank 2.1 *(copy-protected)*	105.
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✓WordStar 3.31	179
✓WordStar 2000 Plus Release 2	285.
Microrim *(not copy-protected)*	
✓Extended Report Writer 1.3	85
✓Clout 2.0	135.
✓R:base 5000 1:01	359
✓R:base 5000 Multi-user 1.0	719
Microsoft *(not copy-protected)*	
✓Multiplan 2.0	119
✓Microsoft Word 3.0	247
✓Windows 1.01	65
✓Quick Basic 1.02	69
✓Project 2.0	239
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✓Crosstalk XVI 3.61	95
✓Remote 1.3	95.
Migent Software *(not copy-protected)*	
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✓Norton Utilities 3.1	59
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Software Publishing *(copy-protected)*	
✓PFS:File B:01	84
✓PFS:Write C:01	84
✓Harvard Total Project Manager 1.1	289.

Not copy-protected versions due to be released soon—*call.*

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✓*SKILL BUILDER PROGRAMS*	
Intro and How to Use:	
Data Bases MS-DOS	
Compaq PC-DOS	
IBM-PC BASIC	*each* 33
✓*TRAINING POWER PROGRAMS*	
How to Use:	
dBase II dBase III Lotus 1-2-3	
Multimate Framework Displaywrite 3	
Multiplan Wordstar	
WordPerfect Symphony	*each* 43.
Individual Software *(copy-protected)*	
✓The Instructor II	26.
✓Professor DOS	33.
✓Tutorial Set *(both items above)*	49
✓Typing Instructor	26.
✓Training for Lotus 1-2-3 *(for vers. 1A & 2)*	37.
✓Training for dBase III	37.

HARDWARE

Manufacturer's minimum limited warranty period is listed after each company name. Some products in their line may have longer warranty periods.

AST Research *(1 to 2 years)*	
SixPakPlus 64k *includes Sidekick vers. 1.5 not copy-protected & DESQView*	169
SixPakPlus 384k *(fully populated)*	219.
✓AST-5251-11	579.
✓AST-3780	579
✓Advantage 128k	369.
RAMpage! *upgrades to 2Mb*	call
✓RAMpage! AT *upgrades to 2Mb*	call
Both RAMpage boards support EMS and fully support EEMS.	
Amdek *(2 years)*	
✓Video 310A mono monitor *(amber)*	159.
✓Color 722 · RGB *(EGA compatible)*	519.
Curtis *(lifetime)*	
ACCESSORIES	
✓Low Profile Tilt and Swivel Pedestal	25.
✓PC Pedestal *(for IBM Mono or Color)*	27.
Portable Pedestal *(for portable computers)*	36.
✓Printer Stand	18
System Stand *(for IBM-PC & XT)*	19.
✓Universal System Stand	25.
CABLES	
Smartmodem to IBM Cable	17.
✓Keyboard Extension Cable *(3 to 9 feet)*	27.
✓Extension Cables for IBM Mono Display	33.
SURGE SUPPRESSORS	
✓Diamond *(6 outlets)*	29.
✓Emerald *(6 outlets, 6 ft cord)*	36.
✓Sapphire *(3 outlets; EMI/RFI filtered)*	$47
✓Ruby *(6 outlets; EMI/RFI filtered, 5 ft cord)*	55
✓Command Center .SPECIAL	79.
DCA *(1 year)*	
✓Smart Alec	639.
✓Irma	769
Epson *(1 year)*	
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✓FX-85 printer *(80 column)*	call
✓FX-286 printer *(136 column)*	call
✓LQ-800 printer *(80 column)*	call
✓LQ-1000 printer *(136 column)*	call
Hayes *(2 years)*	
✓Smartmodem 300	139
✓Smartmodem 1200	389
✓Smartmodem 1200B *(w/Smartcom II)*	349
✓Smartmodem 2400	579
✓Smartmodem 2400B *(w/Smartcom II)*	539
✓Smartcom II 2.1 *(software)*	69
Hercules *(2 years)*	
✓Hercules Color Card *(parallel port)*	159
✓Hercules Graphics Card *(parallel port)*	299
Intel *(chips: 1 year; boards: 5 years)*	
Above Board PC 64k *(upgrades to 2 Meg)*	call
✓Above Board AT 128k *(upgrades to 2 Meg)*	call
Above Board PS 64k C/S/P *(upgrades to 1.5 Meg)*	call
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8087-2 *(works on 8 Mhz computers)*	177.
✓80287 *(for 6 MHz IBM-PC AT)*	225
✓80287-8 *(for 5 MHz IBM-PC AT)*	269.
Kensington Microware *(1 year)*	
✓Masterpiece	94.
key tronic *(90 days)*	
5151 keyboard *(deluxe)*	169.
✓5153 keyboard *(with touch pad)*	279.
Mouse Systems *(3 years)*	
✓PC Mouse with PC Paint+	139.
✓PC Mouse with Ready and PC Paint+	149.
NEC *(90 days)*	
✓Multisync monitor *(EGA compatible)*	549.
Orchid Technologies *(1 to 2 years)*	
Conquest Multifunction Board Øk *upgrades to 2Mb, fully supports* LOTUS/INTEL *expanded memory specification (EMS)*	264
Tiny Turbo 286	459
PC Turbo 286e w/1 Meg	749
✓Eccell Multifunction Board for the AT Øk *upgrades to 1 Meg, fully supports* LOTUS/INTEL *expanded memory specification (EMS) and Error Correction Code (ECC), serial and parallel ports optional*	399.
Paradise Systems *(1 year)*	
✓Color/Mono Card	149.
✓Modular Graphics Card	275.
Princeton Graphics *(1 year)*	
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384k *(fully populated)*	219.
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✓Lotus 1-2-3 ✓WordStar 2000	
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Framework ✓WordPerfect	
dBase II ✓dBase III	
✓MultiMate	*each* 12.
Toshiba *(90 days)*	
All Toshiba printers listed are 24 pin dot matrix.	
✓P321 serial/parallel printer *(80 col.)*	619
✓P351 serial/parallel printer *(136 col.)*	1089
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✓VEGA *(half-card)*	369.

DRIVES

IOMEGA *(90 days)*	
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✓10 Meg cartridge	51.
✓Bernoulli Box 40 Meg w/PC2 card	2499.
✓20 Meg cartridge	69.
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PC Connection *(1 year)*	
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20 Meg Internal Hard Drive *(w/controller and cables)*	449
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PC, XT 360k Drive *(5¼" half-height)*	109
✓AT 360k Drive *(5¼" half-height)*	117

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✓Fuji	27.
✓Maxell	34
✓Verbatim	34
✓Flip Sort *(holds 75 disks)*	16
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Trying to decide which word processor to buy is the trying to decide which college to go to. The decision will change your life forever, but you may never know if it was the best one. Here are five tried and proven professional packages. They all have spell checkers. None are copy-protected. And hard drives are recommended for all. See PC Magazine 1/28.

MultiMate Advantage 3.6 with GraphLink and On-File $289
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Volkswriter 3.0 ....$147
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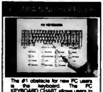

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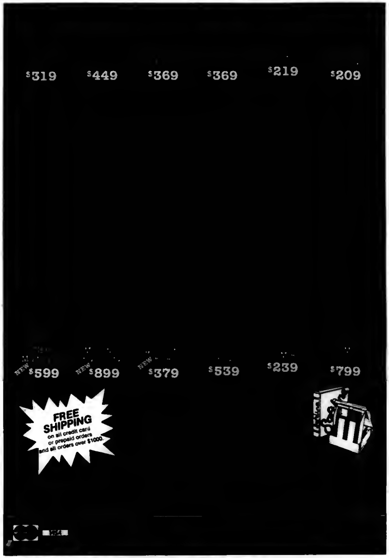

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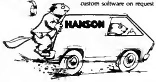

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SYSTEMS PROGRAMMER Arlington County Virginia is looking for a Systems Programmer with experience in the installation and maintenance of multiple DOS/VSE systems running under VM on an IBM 4381 as well as experience installing, maintaining and tuning CICS. Experience is also required in installing and maintaining a variety of operation system-related packages, such as DYNAM/D DYNAM/T Guarding TMON PVM and RSCS. This person must be familiar with data communications under VM and VSE and with ALC and COBOL. Application programming, computer operations and SNA experience are desirable. Salary @ $40,000 with excellent benefits. Official Arlington County application form required. To request application material or additional information call Clarence McGill at (703) 558-2167. Announcement #1226-6A. Arlington County Personnel Dept., 2100 N. 14th St. Arlington County, VA 22201. Deadline filing date 6/27/86. *EOE M/F/H*

RESEARCH TRIANGLE OPPORTUNITIES

The Underwood Group, Inc.

NCC SHOW ISSUE

June 16, 1986
(Classified closing June 6, 1986)

NCC WRAP-UP ISSUE

June 23, 1986
(Classified closing June 13, 1986)

The biggest computer show of the year is being held June 16-19 in Las Vegas. But don't worry if you haven't advertised yet. Computerworld will have one more issue dedicated to the NCC. That will cover everything that happened at The National Computer Conference. This issue will inform our readers who were unable to attend NCC all about it. The happenings, speeches and all current news. Again this year we had bonus distribution of Computerworld at the show. That bonus distribution meant that over 500,000 readers saw your advertisements.

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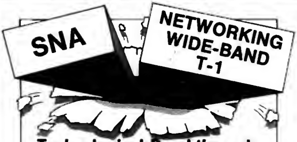

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S/38

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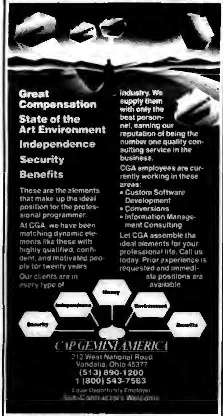

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Pact to alter U.S. chip trade

Aims to increase U.S. share of Japanese mart

By Maura McEnaney

An agreement between the U.S. and Japan on semiconductor trade issues could change the way American chip companies are doing business, some observers said last week.

After almost a year of negotiations, the U.S. and Japan reached a preliminary agreement aimed at solving long-standing trade disputes and increasing the U.S. share of the Japanese semiconductor market.

Sources said the pact, due to be finalized in the next few weeks, will increase the U.S. share of the Japanese chip market from 10% to 20% within five years. It will also establish an export monitoring system and dismiss pending antidumping cases.

To capture 20% of the Japanese market, U.S. chip companies may have to change their product strategies. In Japan, most semiconductors are used for consumer and telecommunications applications, while the majority of U.S.-made chips are designed for computer systems and defense applications.

"The burden is now on U.S. companies to build a product that the Japanese companies will buy," said Jerry Crowley, president of Oki Semiconductor Corp., based in Sunnyvale, Calif., a unit of Oki Electric Co. in Japan.

Some vendors were puzzled over exactly how the agreement would increase the U.S. share of the Japanese market. "I haven't a clue as to how that is going to get done," Crowley said.

Others in the industry were reluctant to comment on what they said was speculation about the contents of the trade agreement. "It's apparent that both governments felt this was a highly sensitive issue," said Tom McDannold, vice-president of adminstration at NEC Electronics, Inc.

The news of the trade accord came two days after the International Trade Commission ruled that U.S. firms were damaged by Japanese chipmakers' dumping, or selling below cost, 64K-byte dynamic random-access memory (RAM) chips in the U.S. market. That ruling, the result of a suit from Micron Technology, Inc. of Boise, Idaho, slapped Japanese firms with import duties ranging from 11.87% to 35.34%.

Before last week's agreement becomes final, it must first be reviewed by the U.S. departments of State, Justice, Treasury and Commerce.

William Tanaka, Washington, D.C.-based counsel for the Electronics Industry Association of Japan, called the published details of the agreement speculative and declined comment for fear of jeopardizing final negotiations.

Other antidumping suits involving 256K-byte dynamic RAMs and erasable programmable read-only memory chips are still pending, but could be dropped as a result of the trade agreement.

Mini vendor Norsk Data good European investment

ACTIVE ISSUES
Kathy Porteus

Many U.S. computer companies are grateful for Europe's brisk business climate, which has significantly offset continued weakness in domestic orders. Individuals can also benefit from Europe's strength by investing in European computer suppliers that are traded on one of the U.S. stock exchanges.

One such company is Norsk Data (NORKZ — 26¾), a $250 million minicomputer vendor based in Oslo. Norsk's stock, which recently underwent a 2-for-1 split, doubled in value last year. Analysts following the company estimate its price-per-share may jump another 50% by year's end.

Norsk sells a fully compatible line of minicomputer systems, offering up to 3.3 million instructions per second (MIPS), for both IBM and non-IBM environments. According to Le-Ellen Spelman, vice-president with Martin Simpson & Co., about 60% of Norsk's installations are for commercial DP and 40% for scientific or technical applications.

Spelman says she expects Norsk to introduce a new high-end, 10-MIPS to 15-MIPS uniprocessor in early 1987. Norsk claims that its current high-end CPU, the ND570, provides roughly the same performance as Digital Equipment Corp.'s VAX 8600 at half the price.

In 1985, Norwegian sales accounted for 50% of Norsk's revenues and two-thirds of its profits. However, the firm is lessening its dependence on domestic business by concentrating its marketing on France (through a partnership with Matra SA), West Germany and the UK.

Robert L. Cole, analyst with Reinheimer Nordberg, Inc., says, "Matra is taking several times the amount of product from Norsk that was promised in the initial sales contract." Simpson's Spelman expects Norsk "to rank fourth in the 1986 European minicomputer market after IBM, DEC, Hewlett-Packard Co. and Wang Laboratories, Inc."

Norsk has a minor presence in the U.S., with two small sales offices selling primarily to the military.

Last year, the firm's pretax margin widened to 19.3% from 17% in 1984. "Norsk achieves such margins because it is a very well-run company," Spelman says.

Norsk benefits from operating efficiencies by offering a product line with a single architecture and single operating system. In addition, the company is not vertically integrated, which has enabled it to take advantage of lower component prices. Finally, by not focusing on the U.S. market, Norsk avoids intense price competition.

But Norsk may not he able to avoid the current oil glut's effect on Norway's economy. Cole of Reinheimer foresees some softness in Norwegian sales, but expects Norsk's increased foreign business to significantly offset such domestic weakness. Low oil prices have improved business conditions for those European countries that are major importers of energy.

Although 40% to 50% revenue growth is not expected to continue, owing to the company's larger size, Norsk should experience several years of over 30% growth, according to analysts. Spelman estimates the company will earn $1.75 per share in 1986 and $2.20 per share in 1987. Cole is looking for 1986 earnings of $1.85 per share.

Both analysts recommend purchase of Norsk stock, which currently sells at a discount to the price/earnings multiples of other minicomputer companies. Norsk is undervalued, they say, because U.S. investors tend to shy away from foreign firms, although, as in Norsk's case, such stocks present a good investment opportunity.

Porteus is president of Strand Research Associates, a Centerville, Mass.-based company that provides customized research services for financial and high-tech firms.

Citicorp on verge of Quotron buy-out

LOS ANGELES — Without formally agreeing to be acquired by Citicorp, Quotron Systems, Inc. paved the way for a takeover last week by telling its shareholders it would "not actively oppose" Citicorp's $19-per-share tender offer.

Most stockholders are expected to tender their shares at that price, which would give the U.S.'s largest bank a strong presence in the financial information services market. Quotron's stock quote service is expected to benefit technologically from increased research and development funds after the proposed takeover.

About 40% of Quotron's stock is owned by institutions and an estimated 25% by risk arbitrageurs.

Lotus acquires graphics firm

From page 150

sheets; Isys Corp., developer of products that allow data from public data bases to be input into spreadsheets; Infocenter Software's Ilink, a micro-to-mainframe link; and Software Arts, Inc., developer of Visicalc, Spotlight and TKsolver.

Lotus announced its intention to enhance the ability of Graphic Communications products to work with Lotus' 1-2-3 and Symphony.

However, analysts were unsure about Lotus' specific plans for the products.

"I think the strategic question is to what extent the graphics packages get incorporated into future releases of 1-2-3 or Symphony to improve their graphics capability," said David Readerman, a computer and software services analyst with Smith Barney, Harris Upham & Co.

Both firms expect no layoffs to result from the acquisition. "We don't see any change in staffing as a result of the acquisition, which is good news for everybody," said Lotus spokeswoman Janet Logan.

Graphic Communications currently employs approximately 60 people.

"We have got some very strong products we can sell on Day 1, and we can add a lot of value by raising the visibility of those products through our marketing channels," Kolowich said.

"We are also acquiring an organizational capability and some first-class development talent in the graphics area," he said.

CORRECTION

James J. Renier was recently named president and chief operating officer of Honeywell, Inc. [CW, May 26, page 144].

Sytek loses IBM contract, lays off 50

By Clinton Wilder

MOUNTAIN VIEW, Calif. — Sytek, Inc. recently became the latest victim of a canceled IBM OEM contract, as the local-area network vendor announced the layoff of 50 manufacturing employees, or about 10% of its work force.

IBM, continuing the pattern of cutting off product suppliers such as Computer Memories, Inc. and Seagate Technology, Inc., recently told Sytek it would not renew its contract for Sytek to supply the PC Network. L. George Klaus, the new president and chief operating officer of Sytek, said both companies had signed a one-year extension of the contract, but that IBM "changed its mind." The contract will expire within the next two months.

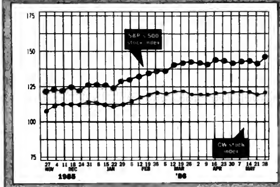
Klaus predicted that Sytek, unlike other firms that have had similar experiences, will not experience losses as a result of the lost business. "Over a year ago, we planned that this might happen," he said. "We've had less time to adjust than we would have liked, but 50% to 55% of our business has always been end-user sales. We'll continue to grow that."

Klaus said that Sytek's revenue will experience a minimal drop in the quarter ended last week and a "more significant drop" In the quarter ending Aug. 29. Sytek recorded sales of $20.3 million and profits of $2 million in the quarter ended Feb. 28.

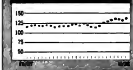
COMPUTER INDUSTRY

MITCHELL J. HAYES

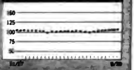
Computerworld stock trading index



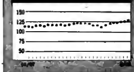
Computer systems



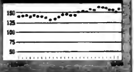
Software and DP services



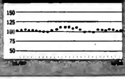
Peripherals and subsystems



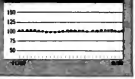
Supplies and accessories



Semiconductors



Leasing companies



[illegible]

	5/21/86	5/28/86
Computer systems	127.6	[illegible]
Software and DP services	106.1	106.4
Peripherals and subsystems	125.9	128.4
Supplies and accessories	150.8	[illegible]
Semiconductors	106.2	106.4
Leasing companies	104.6	104.6
CW stock index	120.0	121.3
Standard and Poor's 500 stock index	140.8	187.5

Computerworld stock trading summary

CLOSING PRICES WEDNESDAY, MAY 28, 1986

COMPUTER SYSTEMS

EXCH		52 WEEK RANGE (1)	PRICE CLOSE MAY 28 1986	PRICE WEEK NET CHNGE	PRICE WEEK PCT CHNGE
O	ALPHA MICROSYSTEMS	5- 8	6 3/4	0	0.0
O	ALTOS COMPUTER SYST	9- 19	16 1/8	-1 3/8	7.8
A	AMDAHL CORP	10- 16	15 3/4	+1 1/8	+7.6
O	APOLLO COMPUTER	9- 31	15 1/4	0	0.0
O	APPLE COMPUTER INC	14- 37	37 1/4	+ 1/4	+0.6
N	AT&T	19- 28	25 1/8	+1	+4.1
N	BURROUGHS CORP	52- 71	58 5/8	- 1/8	-0.2
O	COMPAQ COMPUTER CP	5- 18	17 1/4	- 1/8	-0.7
O	COMPUTER AUTOMATION	1- 9	3 1/8	+1	+47.0
A	COMPUTER CONSOLES	5- 14	10 3/4	+ 1/8	+1.1
N	CONTROL DATA CORP	15- 38	25 7/8	+2 3/8	+10.1
O	CONVERGENT TECHNOL	5- 13	10	+ 1/8	+1.2
O	CPT CORP	4- 8	4 3/8	+ 1/8	+2.8
N	CRAY RESEARCH INC	25- 89	89 1/8	+2 5/8	+3.0
O	DAISY SYSTEMS CORP	11- 38	12	1/4	-2.0
N	DATA GENERAL CORP	31- 76	38 1/8	-1 1/2	-3.6
N	DATAPOINT CORP	5- 22	7 7/8	+ 1/8	+1.8
N	DIGITAL EQUIPMENT	42- 91	90	+2 7/8	+3.2
A	EECO INC	13- 18	18 7/8	+1 1/2	+8.8
N	ELECTRONIC ASSOC.	3- 7	5 7/8	+ 1/8	+2.1
N	FLOATING POINT SYST	19- 42	37 1/4	- 5/8	-1.8
N	FOXBORO	22- 31	30 3/4	+1 1/2	+5.1
N	GOULD INC	20- 38	22 1/4	+ 1/8	+0.5
N	HARRIS CORP	22- 35	22 1/4	+ 7/8	+2.7
N	HEWLETT-PACKARD CO	29- 46	46 1/8	+2 7/8	+6.6
N	HONEYWELL INC	54- 87	77 1/4	+ 1/4	+0.3
N	IBM	117- 158	151 3/8	+6 7/8	+4.7
O	IPL SYSTEMS INC	1- 4	3	0	0.0
N	ITT CORP	38- 46	48 3/8	+2 7/8	+6.3
N	M/A-COM INC	13- 24	16 7/8	+ 3/4	+4.8
N	MANAGEMENT ASSIST	2- 28	2 3/8	0	0.0
N	MATSUSHITA ELEC(ADR)	49- 88	89	+1 1/2	+1.7
O	MENTOR GRAPHICS	13- 30	16 1/2	- 1/4	-1.4
N	MODULAR COMPUTER SYS	5- 8	6 7/8	0	0.0
N	MOHAWK DATA SCI	1- 13	3 1/8	- 1/4	-7.4
N	NBI INC	11- 20	11 1/2	+ 1/2	+4.5
N	NCR	25- 55	54 7/8	+1 1/8	+2.0
N	PERKIN-ELMER	22- 36	30	+ 3/8	+1.2
N	PRIME COMPUTER INC	15- 27	20 1/8	- 3/8	-1.8
N	SPERRY CORP	39- 75	74 5/8	+2 3/8	+3.2
O	STRATUS COMPUTER INC	9- 29	21 3/4	-1 3/4	-7.4
O	TANDEM COMPUTERS INC	13- 33	20 7/8	-1 5/8	-5.0
N	TANDY CORP	24- 44	42 1/8	+2 3/8	+5.8
O	TELEVIDEO SYSTEMS	2- 4	3 1/2	+ 1/8	+3.7
O	TELXON CORP	9- 21	21 1/8	+ 1/4	+1.1
N	TEXAS INSTRUMENTS	86- 141	134 5/8	-2	-1.4
A	ULTIMATE CORP	9- 34	34 1/4	+3 1/2	+11.3
O	VECTOR GRAPHICS INC	1- 1	1/8	0	0.0
A	WANG LABS "B"	15- 25	16 1/2	- 3/4	-4.3
A	WANG LABS "C"	15- 29	19 7/8	- 3/8	-2.1
N	XEROX CORP	37- 72	61 5/8	+3 7/8	+6.7

SUPPLIES & ACCESSORIES

EXCH		52 WEEK RANGE (1)	PRICE CLOSE MAY 28 1986	PRICE WEEK NET CHNGE	PRICE WEEK PCT CHNGE
N	AMERICAN BUS PRODS	21- 38	33	+ 1/4	+0.7
N	BARRY WRIGHT	17- 29	23 5/8	+ 1/2	+2.1
A	DUPLEX PRODUCTS INC	13- 22	21 3/4	- 1/2	-2.2
N	ENNIS BUS. FORMS	14- 38	34 7/8	+1 1/8	+4.7
N	3M COMPANY	74- 107	105 1/2	+7	+7.1
N	MOORE CORP LTD	15- 27	26	+2 1/8	+8.6
O	STANDARD REGISTER	22- 45	38 1/2	+ 3/4	+1.6
N	WALLACE COMP SERVICE	30- 46	46	+1 5/8	+3.4

EXCH: N—NEW YORK; A—AMERICAN; P—PACIFIC; B—BOSTON;
L—NATIONAL; M—MIDWEST; O—OVER THE COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & DP SERVICES

EXCH		52 WEEK RANGE (1)	PRICE CLOSE MAY 28 1986	PRICE WEEK NET CHNGE	PRICE WEEK PCT CHNGE
O	ADVANCED COMP TECH	2- 8	6 1/4	+ 5/8	+11.1
N	ADVANCED SYSTEMS INC	9- 20	17 1/2	+ 1/2	+2.9
N	AGS COMPUTERS INC	10- 29	21 1/2	+ 3/4	+3.6
O	AMERICAN SOFTWARE	9- 15	12 3/8	+ 3/8	+3.1
N	ANACOMP INC	2- 6	5 7/8	+ 1/4	+4.4
O	ANALYSTS INTL CORP	5- 11	7 1/2	+ 1/4	+3.4
O	ASHTON TATE	8- 31	31 3/8	+2 7/8	+10.0
O	ASK COMPUTER SYSTEMS	7- 25	12 1/8	0	0.0
B	ASTRADYNE COMP IND	1- 3	1 5/8	0	0.0
N	AUTOMATIC DATA PROC	35- 77	76 5/8	+6 1/8	+8.4
O	COMPUTER NETWORK	5- 9	7 3/4	1/8	-1.5
O	COMPUTER ASSOC INT'L	9- 24	23 3/4	+ 3/4	+3.2
O	COMPUTER HORIZONS	5- 11	13 7/8	0	0.0
N	COMPUTER SCIENCES	13- 38	37 1/2	+2 7/8	+8.3
O	COMPUTER TASK GROUP	10- 28	25 3/4	+1 1/2	+6.1
O	COMPUTER USAGE	1- 3	3	0	0.0
O	COMPUTONE SYSTEMS	3- 11	4 1/4	1/8	2.8
O	COMSERV CORP	1- 9	3 1/4	0	0.0
O	COMSHARE	7- 13	13 1/8	+ 1/8	+0.9
N	CULLINET SOFTWARE	12- 33	16 1/4	+1	+6.5
O	CYCARE SYSTEMS INC	13- 27	18 3/4	+ 1/8	+0.7
O	HOGAN SYSTEM INC	4- 12	10 1/8	5/8	5.8
N	GENERAL ELECTRIC CO	56- 91	81	+4 1/2	+5.9
N	GENL MOTORS E (EDS)	20- 46	66 1/8	- 1/8	-0.2
N	GTE CORP	38- 54	50 3/8	+ 7/8	+1.7
O	INFORMATION SCIENCE	1- 5	3 3/8	0	0.0
O	INFOTRON SYSTEMS CP	13- 34	18 1/2	+ 1/2	+3.1
O	KEANE ASSOCIATES	10- 20	14	0	0.0
N	LOGICON	25- 43	37 7/8	+1 1/2	+4.1
O	LOTUS DEVELOPMENT CP	15- 37	36 1/2	+1 3/4	+5.0
O	MCI COMMUNICATIONS	7- 13	9 3/4	- 1/4	-2.5
O	MNGT SCI AMER INC	7- 16	15 3/4	+1 3/8	+9.5
O	MATHEMATICAL APP GRP	1- 6	1/2	0	0.0
O	MICOM SYSTEMS INC	12- 35	14 3/4	1/4	-1.6
O	MICROPRO INT'L CP	2- 4	2 1/2	+	+2.5
O	NATIONAL DATA CORP	8- 29	21 1/4	-1 1/8	-5.0
O	ON-LINE SOFTWARE INT	4- 16	16	+2 1/2	+18.5
O	PANSOPHIC SYSTEMS	14- 34	34 1/4	+ 3/4	+2.2
N	PLANNING RESEARCH	11- 23	21 3/8	- 5/8	-2.8
O	POLICY MGMT SYSTS CP	18- 35	20 1/4	+ 1/2	+2.5
O	PROGRAMMING & SYS	4- 10	8 3/4	+ 1/8	+1.4
O	REYNOLDS & REYNOLD	30- 65	31 1/4	+ 1/4	+0.8
O	SEI CORP	13- 27	22 1/2	- 1/2	-2.0
O	SHARED MEDICAL SYST	26- 38	35 5/8	-1	-2.7
O	SCIENTIFIC COMPUTERS	4- 8	4 3/4	0	0.0
O	SOFTWARE AG	12- 22	20	1/4	-1.2
N	URS CORP	10- 18	18 5/8	+ 3/4	+4.7
N	UCCEL	11- 21	21 3/8	+1 1/8	+5.5
O	VM SOFTWARE	17- 30	29 1/2	+1 3/4	+6.3

SEMICONDUCTORS

EXCH		52 WEEK RANGE (1)	PRICE CLOSE MAY 28 1986	PRICE WEEK NET CHNGE	PRICE WEEK PCT CHNGE
N	ADVANCED MICRO DEV	22- 38	26	+ 5/8	+2.4
O	ADV'D SEMICONDUCTOR	7- 23	11 1/4	0	0.0
N	ANALOG DEVICES INC	14- 24	22 7/8	- 1/8	-0.5
O	ANALOGIC CORP	11- 18	12 3/8	- 1/8	-1.0
N	APPLIED MAGNETICS CP	9- 18	16 7/8	+ 3/8	+2.0
O	AVANTEK	19- 28	18 3/8	+1 1/8	+6.1
O	HADCO CORP	3- 7	5 1/2	- 1/4	-4.3
O	INTEL CORP	21- 33	26	- 1/2	-1.8
O	MICRO MASK INC	5- 12	5 3/8	- 1/8	-2.2
N	MOTOROLA INC	29- 48	46 1/2	0	0.0
N	NAT'L SEMICONDUCTOR	10- 15	14 3/8	+ 1/2	+3.6
N	TERADYNE	17- 33	25 3/4	- 1/4	-0.9

PERIPHERALS & SUBSYSTEMS

EXCH		52 WEEK RANGE (1)	PRICE CLOSE MAY 28 1986	PRICE WEEK NET CHNGE	PRICE WEEK PCT CHNGE
P	AM INTERNATIONAL	3- 8	8 3/8	+ 1/4	+3.0
A	ANDERSON JACOBSON	2- 5	2 1/4	0	0.0
O	AST RESEARCH INC	7- 33	15 3/4	1 1/4	7.3
O	AUTO-TROL TECHNOLOGY	3- 13	4 3/8	5/8	12.5
O	AVANT-GARDE COMPUTING	3- 21	4 1/8	+	+1.5
O	BANCTEC INC	9- 13	12 1/2	+1	+8.8
O	BEEHIVE INT'L	1- 2	1/8	0	0.0
N	BOLT,BERANEK & NEW	30- 47	47	+2 3/4	+6.2
O	CAMBEX CORP	1- 3	1 1/2	0	0.0
N	CENTRONICS DATA COMP	3- 11	8 1/2	+ 1/4	+4.0
A	CETEC CORP	6- 9	6 7/8	5/8	8.3
A	COGNITRONICS	4- 7	4 5/8	+ 1/2	+12.1
N	COMPUGRAPHIC CORP	23- 38	23 3/4	+ 3/4	+3.2
O	COMPUTER TRANSCEIVER	0- 1	7/8	0	0.0
N	COMPUTERVISION CORP	9- 44	17 7/8	+1 1/4	+7.5
N	CONRAC CORP	12- 18	17 1/2	+ 3/4	+4.4
A	DATAPRODUCTS CORP	11- 20	17 1/4	+ 1/4	+1.4
A	DATARAM CORP	4- 17	16 7/8	+ 3/8	+2.2
O	DATA SWITCH CORP	4- 8	7 1/4	1/4	3.3
O	DATUM INC	5- 9	6 3/4	0	0.0
O	DECISION DATA COMPUT	10- 20	12 7/8	+ 3/8	+3.0
O	ENDATA, INC	2- 8	6 1/4	+ 1/8	+2.0
O	EVANS & SUTHERLAND	12- 27	26 1/8	+ 1/8	+0.4
O	GANDALF TECHNOLOGIES	5- 13	8 5/8	+ 1/8	+1.6
N	GEN'L DATA COMM IND	8- 21	13 3/8	+ 1/2	+3.8
N	HAZELTINE CORP	17- 30	17	+ 1/2	+3.0
O	ICOT CORP	3- 12	12	0	0.0
O	INFORMATION INTL INC	10- 17	15 1/2	+1	+6.9
O	INTECOM INC	3- 11	6 5/8	+1 1/4	+38.5
O	MEGADATA CORP	3- 6	3 1/8	+ 1/8	+4.1
A	MSI DATA CORP	7- 14	13 7/8	+ 1/4	+1.8
N	NASHUA CORP	24- 53	52 3/4	+3 3/4	+7.6
O	NETWORK SYSTEMS CORP	11- 27	13 7/8	+ 1/8	+0.9
N	NO AMERICAN PHILIPS	32- 47	41 3/4	+1	+2.4
N	NORTHERN TELECOM LTD	26- 41	29 7/8	- 3/4	+2.5
O	OMEX	1- 3	1/4	0	0.0
N	PARADYNE CORP	9- 19	11	+ 1/4	+2.3
A	PENRIL CORP	7- 14	7 3/8	1/8	1.6
N	PLESSEY CO (ADR)	16- 38	34 1/2	0	0.0
O	PRINTRONIX INC	9- 16	13 1/8	3/8	2.7
O	QMS INC	6- 16	13 3/4	0	0.0
O	RAMTEK CORP	2- 7	5 5/8	+ 1/8	+2.2
N	RECOGNITION EQUIP	9- 17	16	3/8	2.2
N	SANDERS ASSOCIATES	29- 44	29 5/8	+ 1/4	+0.8
O	SCAN TRON CORP	6- 22	19 3/4	+ 3/4	+3.9
N	SCIENTIFIC ATLANTA	10- 15	10 3/8	0	0.0
O	SEAGATE TECHNOLOGY	5- 13	12 3/4	1/8	0.9
N	STORAGE TECHNOLOGY	1- 5	4 1/8	1/8	2.9
O	SYKES DATATRONICS	0- 2	1/8	1/8	41.5
A	T BAR INC	5- 9	5 7/8	+ 1/8	+2.1
A	TAB PRODUCTS CO	9- 15	14 1/8	0	0.0
O	TANDON CORP	3- 9	7 1/8	3/8	5.0
A	TEC INC	5- 13	5 3/8	1/8	2.2
N	TEKTRONIX INC	47- 68	62 1/8	+2 3/8	+3.9
N	TELEX	34- 66	62 1/8	1	1.5
O	TESDATA SYSTEMS CP	0- 3	5/8	0	0.0
N	TIMEPLEX INC	15- 23	18 3/8	+ 1/8	+0.6
N	TITAN CORP	4- 11	10	+ 1/4	+2.5
O	VISUAL TECHNOLOGY	1- 3	5/8	0	0.0

LEASING COMPANIES

EXCH		52 WEEK RANGE (1)	PRICE CLOSE MAY 28 1986	PRICE WEEK NET CHNGE	PRICE WEEK PCT CHNGE
N	COMDISCO INC	7- 24	20 1/2	1/4	1.2
N	CONTINENTAL INFO SYS	5- 21	19 5/8	+ 1/4	+1.2
O	FINALCO GROUP INC	3- 5	3 1/2	+ 1/8	+3.6
O	PHOENIX AMERICAN INC	2- 6	4 3/4	+ 1/8	+2.7
O	SELECTERM INC	6- 12	7 3/8	+ 1/8	+1.7
N	U.S. LEASING	22- 48	41 7/8	+1 7/8	+4.6

Source: Trade Quotes, Inc.

COMPUTER INDUSTRY

INSTANT ANALYSIS

"I hope we do not have to retaliate against our trading partners. But let's face it, we've done a lot of talking with countries like Japan but are getting nowhere. Whether it be in semiconductors, telecommunications or fiber optics, they are not opening their markets to U.S. competition."

— **U.S. Rep. Stan N. Lundine (D-N.Y.), during debate on the House trade bill**

Lotus buys graphics firm

Hopes to tap growing market, round out line

By Douglas Barney

CAMBRIDGE, Mass. — Continuing its product acquisition strategy, Lotus Development Corp. last week announced that it had signed a letter of intent to acquire Graphic Communications, Inc., a Waltham, Mass.-based developer of the popular Freelance and Graphwriter micrographics software packages.

The acquisition fills an important gap in Lotus' product line as the spreadsheet leader continues to diversify into other business software markets. Lotus expects the microcomputer graphics market to enjoy healthy growth, largely owing to reduced costs of hardware and graphics devices such as plotters and printers.

"There is a significantly large group of users of 1-2-3 and Symphony who are looking for something more in business graphics," said Michael Kolowich, corporate vice-president of marketing for Lotus.

According to securities analysts, Lotus paid some $7 to $10 million in cash and agreed to an earn-out formula, under which Graphic Communications principals receive a portion of the revenue from Graphic Communications products.

Graphic Communications, a 5-year-old private firm with about $5 million in annual sales, is considered one of the top micro graphics software vendors behind market leader Decision Resources, Inc., developer of Chartmaster.

After the acquisition is approved, Graphic Communications will become part of Lotus' Business Products Division. The acquisition is expected to be completed by June 15, pending approval of the boards of both firms and Graphic Communications' shareholders.

Since early 1985, Lotus has acquired GNP Development Corp., maker of HAL, an English-language interface for 1-2-3; Dataspeed, Inc., developer of products that input stock quotations into Lotus spread-

See **LOTUS** page 148

Bell Atlantic helps Sorbus cash in

By Alan Alper

FRAZER, Pa. — Eighteen months after it was acquired by Bell Atlantic Corp., third-party maintenance firm Sorbus, Inc. today finds itself in a complete role reversal.

As part of Management Assistance, Inc., Sorbus was a cash cow and its profits were used to finance the beleaguered operations of its sister company, minicomputer maker Basic Four. In 1984, Sorbus was underfinanced and fading fast. By early 1985, as part of arbitrageur Asher Edelman's piecemeal divestiture of Management Assistance, Sorbus was sold to Bell Atlantic for $185 million.

Sorbus' Ross

Sorbus is currently benefiting from the deep pockets and service-industry savvy of its acquisitive $9 billion parent. Continuing to concentrate on IBM and compatible large-systems service, Sorbus is now in a position to cash in on maintenance opportunities presented by its various sister companies within Bell Atlantic Enterprises.

"We're part of a total solution at Bell Atlantic Enterprises, and customers are comfortable buying from a 100-year-old Bell operating company," notes Louis Ross, Sorbus president.

Sorbus is picking up maintenance revenue from relationships with customers of Bell Atlantic's telephone companies, its telecommunications subsidiary Bell Atlanticom and the retail Bell Atlantic Business Centers in the Compushop, Inc. chain — another Bell Atlantic acquisition.

"We also get customer leads from Tricontinental Leasing Corp., a Bell Atlantic

See **BELL** page 124

INDUSTRY INSIGHT
Glenn Rifkin

Bandwagon a shaky ride

Last December, as the historically disappointing New England Patriots football team piled victory upon important victory, their hastily built bandwagon began creaking under the weight of converts, reawakened diehards and fair-weather fans. But after their embarrassing dissection at the hands of the Chicago Bears in the Super Bowl, the Patriots' bandwagon emptied quicker than a six-pack at a poker game.

For the players in the big leagues of the computer industry, the bandwagon effect is a familiar and unpleasant fact of life. As the industry has run into some hard times of late, one-time superstars have learned how fickle bandwagon riders can truly be. It works both ways.

Take Digital Equipment Corp., for example. In late 1983, DEC, once a high flier and darling of consultants and the press alike, became the object of scorn and derision.

The company was in the midst of one of the more poorly conceived personal computer strategies to come down the pike, and internal accounting problems had failed to catch and alert analysts to a poor fiscal quarter. This, combined with a lengthy reorganization, caused DEC to be painted as a stumbling giant, in no way positioned to compete with IBM or even its more suitable foes Data General Corp. and Wang Laboratories, Inc.

The DEC bandwagon, crowded to

See **BANDWAGONS** page 120

Rifkin is a Computerworld *senior editor.*

Bill said to aid U.S. high tech

Fights 'unfair' imports, sends message overseas

By Mitch Betts

WASHINGTON, D.C. — The massive trade reform bill approved recently by the U.S. House of Representatives contains a variety of provisions designed to help the U.S. telecommunications, semiconductor and computer industries. Some provisions attempt to fight "unfair" import practices, while others try to improve the climate for U.S. exports.

The 295-115 vote approving the Trade and International Economic Policy Reform Act of 1986 was intended to send a signal to foreign trading partners that the U.S. will not tolerate the continuing erosion of its trade balance, several legislators said.

The U.S. Senate, which will write its version of trade legislation this summer, is expected to approve more moderate legislation than did the House. President Ronald Reagan said last week he would veto the House version as "kamikaze legislation." He claimed the U.S. has made progress in opening foreign markets, citing an agreement for more sales of U.S. semiconductor chips in Japan (see related story on page 148).

For the telecommunications industry, the House bill would reqoire the president to negotiate trade agreements that remove foreign barriers to exports of U.S. telecommunications products. If the negotiations fail, the president would be forced to restrict access to the U.S. market.

"Only the threat of legislatively

See **BILL** page 124

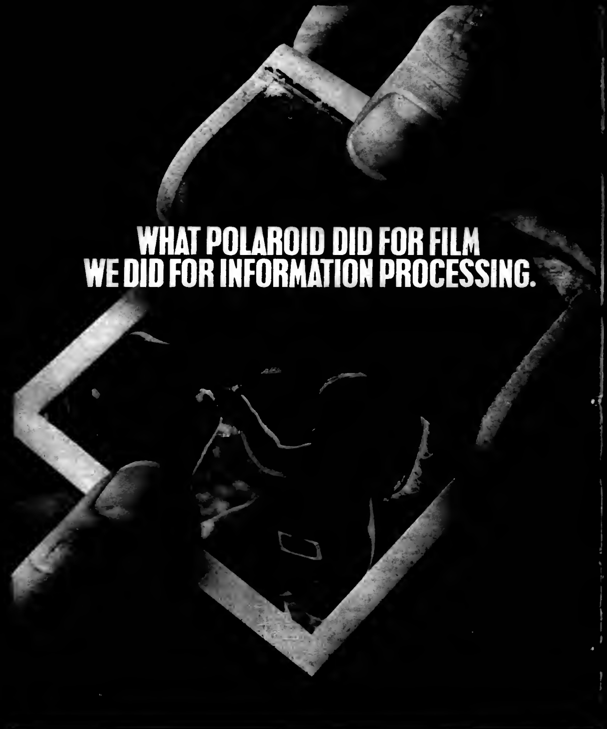
DATA VIEW

Quarterly earnings: Autodesk, Novell double

Company	Net Income Feb.-April, 1986 (thousands of dollars)	Percent Change From 1985	Revenue Feb.-April, 1986 (thousands of dollars)	Percent Change From 1985
Autodesk, Inc.	2,426	+118	11,027	+118
Analog Devices, Inc.	5,979	−30	82,996	0
Datapoint Corp.	3,798	−4	82,821	−6*
Encore Computer Corp.	(2,719)	–	650	+842
Floating Point Systems, Inc.	3,380	+6	32,351	+7
Intelogic Trace, Inc.	5,315	+1	40,052	−1
Novell, Inc.	2,004	+151	16,070	+129
Ultimate Corp.	4,533	+48	41,213	+47

Parentheses indicate loss.
* [illegible]

[illegible]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